THE IRON AGE

New York, Thursday, February 17, 1910.

THE MODERN PATTERN SHOP.

Some Representative Plants, with Details of Their Arrangement and Equipment.

At the meeting of the Chicago Foundry Foremen held Saturday evening, January 22, George F. Reinhard of the Oliver Machinery Company, Grand Rapids, Mich., gave an address on "Modern Pattern Shops," illustrating it with lantern slides. In introducing the views and descriptions Mr. Reinhard said:

"Patternmaking as a distinct craft has existed but a few years, though patterns have been made for centuries. In the old days the man who could best produce the pattern was given the duty to perform. He may have been a cabinet maker, a carpenter, or any other ingenious craftsman who could skillfully wield the rough tools of the period. Since the middle of the last century patternmaking has been accepted as an art or a craft of such importance as to be divorced from the other trades. Having class and distinction, it was placed where it belongs in the line of mechanical trades, near the head, and it is one line of wood manufacturing where the innovation of machinery has not lessened the demand for the patternmaker with brains and originality, and as an aid to his fertility of brain we have been brought to face the problem of his shop environment. For many years the pattern shop cut no figure at all in the planning of workshops. It mattered not to the owner where this department was located as long as he did not have to look at it very much. It never was a money producer, so it lacked the essential quality to give it commercial value in his mind, and anything was good enough for the patternmaker.

The New Status of the Pattern Shop.

"Up to a period within the years that one may count upon the finger tips it was a common practice among owners of machine shops to exercise the utmost care regarding the machine shop location, its light, its ventilation and its iron or metal working tools. After these were completely cared for and the question of patternmaking came up it was a case of: 'Oh, haven't you some corner you can poke it into? Utilize the attic.' 'Put it in the basement and don't use any more equipment than you actually have to.' 'Get along with the cheapest tools you can find; any old thing is good enough to cut wood. It is easy to cut.' 'Haven't you some part of the shop that you can't use for anything else? Put the pattern shop there.' 'We have to put so much money into the patternmaker's wages we can't afford to do anything more for him.'

"This sort of thing is rapidly being consigned to the realm of recollection and the new order is to give the pattern shop its rightful place in the works. What shall we consider its rightful place? Wherever there is plenty of good wholesome ventilation and an abundance of light and plenty of room. Put it next to the drafting department, if you can. No one is more intimately associated with the designer than the patternmaker.

"We acknowledge that the draftsman requires a fine light. The patternmaker needs the same light, since he must read the drawings and work to them. He needs good air for the same reason that you and I need it. No chance for argument there. If you run your own foundry let the pattern shop be next door, so the foundry boss can be neighborly. The designer and the patternmaker both need him if he is next to his job.

"I might take some of your time in describing and illustrating the unattractive small shops I have seen and visited; the underground places, those top story and attic rooms in old ready-to-tumble buildings, where the patternmaker and his helper eke out a scanty existence in job patternmaking, but I feel there would be nothing gained by it. Fortunately such places are dwindling in number gradually."

The speaker then showed a series of lantern slides illustrating a number of well constructed pattern shops in different parts of the country. He called attention to the essential points in design of each separate plant. The following is a summary of his remarks:

The Allis-Chalmers Company Pattern Department.

The pattern department of the Allis-Chalmers Company, at West Allis, Milwaukee, consists of two buildings side by side, each 959 ft. in length. The pattern storage building is five stories high and at one end there is an additional building containing the general offices of the company, making a total length of 1000 ft. The dry kilns furnishing the pattern lumber are located in the center of the pattern storage on the first floor. The pattern storage building has brick walls and reinforced concrete floors. The building is divided into five units by heavy brick fire walls. All of the openings in these walls are provided with self-closing fire doors. The windows are of wire glass. The building is equipped with a sprinkler system, and every precaution has been taken, first, to localize a fire should it occur, and, second, to extinguish it promptly.

The pattern shop is a one-story structure next to the pattern storage and extends the entire length of the building. The pattern shop, like the pattern storage, is divided into five units, the two units at the ends being utilized for pattern shop entirely, while the central unit comprises the flask shop and the planing mill. Fig. 1 is a view of this shop taken from the end of one of the pattern shop units. This planing mill feature is one that could be duplicated with advantage in many large pattern shops. When a large pattern is to be constructed the bill for the stock required is sent to the planing mill and the stock got out in accordance with the bill. It is then loaded on a truck and taken to the patternmaker who has to do the job. This relieves the machines in the pattern department of all of the heavy work. This pattern shop is lighted by windows on the side and skylights on the roof. Were the construction possible lights on both sides would be preferable. A hot water heating system is employed, the water being circulated by a pump in the engine house, thus insuring uniform heat at all times. There is a separate department in which all patterns are sandpapered and varnished, the work being done by men and boys who attend to this only, thus saving some of the time of the high priced patternmakers.

The pattern shop of the Falk Company of Milwaukee, Wis., next illustrated, is 200 ft. long, 75 ft. wide, and is lighted by windows on both sides. On

Fig. 1.—Interior of the Pattern Department of the Allis-Chalmers Company, West Allis, Wis.

Fig. 2.—Interior of the Shop of the Standard Pattern Works, Detroit.

Fig. 3.—One End of the Pattern Shop of the Crocker-Wheeler Company, Ampere, N. J., Showing Method of Driving Cutting-off Saw.

account of the fact that the roof was not very high the light in the center is not so strong as it should be, but gives fairly satisfactory results.

The pattern shop of the Carnegie Technical Institute of Pittsburgh is one of the lightest pattern shops, if not the lightest, in the country. The ceiling is very high, which gives a large wall area for side windows. There are windows arranged on three sides of the room. Mr. Reinhard also illustrated the foundry of this Institute and gave a general view of the group of buildings as they will appear when completed.

He next showed the office and shop of the Standard Pattern Works at Detroit. This view, Fig. 2, illustrated the results possible even when it is necessary to crowd the equipment into a low and poorly lighted room where the men have to do a considerable portion of the work by artificial light. Mr. Henry, owner and manager, has been successful, however, in gathering together a force of patternmakers, who are thoroughly interested in the success of the company, and so has been able to make a good showing even in these crowded quarters.

The new pattern shop of the American Locomotive Works at Schenectady, N. Y., is lighted by windows on three sides and a long skylight in the roof. The floor is broken up by two series of posts extending down the sides of the center bay, but the space between is ample for the construction of fairly large patterns. The center bay is devoted almost wholly to machinery, the patternmakers' benches being arranged in the side bays.

The new pattern shop of the Bethlehem Steel Company, South Bethlehem, Pa., is 60 x 320 ft., and gives employment to 65 men and boys. Like the plant of the American Locomotive Works, it is lighted by windows at the sides and by a monitor roof in the center. The arrangement of machines is similar to that at Schenectady. Next the pattern shop of the Milwaukee Trade School was illustrated, and Mr. Reinhard spoke of the advantages of such schools.

Individual Electric Drives.

The pattern shop of the Crocker-Wheeler Company, Ampere, N. J., Figs. 3 and 4, contains some features of particular interest. In the first place, the shop is located in a gallery along one side of the machine shop, where it receives ample side light from windows in the wall and also light from the monitor roof over the center bay of the machine shop. This company is one of the first in the country to employ direct drives for the machines installed, and the two illustrations show how standard machines were equipped with

motors after they arrived at the plant of the Crocker-Wheeler Company. Alternating current motors had not then come into vogue to the same extent as now, and hence the entire equipment consists of direct current machinery. The swinging cut-off saw is driven by a motor mounted above it in such a way that the motor serves as a counterweight to swing the saw back after it has completed a cut. The band saw is driven by a motor mounted on an extension of the shaft passing through the lower wheel. The lathes are equipped with motors either mounted above or behind the head stocks, while the saws and surfaces are equipped with motors mounted on the floor near the base of the machine.

Fig. 4.—Pattern Shop of the Crocker-Wheeler Company, Located in the Gallery of the Machine Shop.

A Pittsburgh District Shop.

Several views of the new pattern department of the Mesta Machine Company of Homestead, Pa., were given, two of these being reproduced in Figs. 5 and 6. This plant is a three-story structure, having steel trusses encased in concrete for fire protection. The floors are of reinforced concrete, and with the exception of a thin wooden floor laid over the concrete there is nothing in the building that can burn except the patterns that are in the process of construction. The pattern shop really forms a part of the foundry building. On the lower floors there is a line of posts down the center which are 20 ft. apart. The rooms on each of the floors are 70 x 200 ft., with ample windows on all sides, which give abundance of light.

Fig. 5.—Ground Floor of the Pattern Department of the Mesta Machine Company, Homestead, Pa.

On the top floor there is also a skylight. There is a foreman on each floor and the foreman's office is arranged upon each floor with provisions for caring for drawings. The first is a basement floor in which is stored the lumber, and here the rough cutting to approximate dimensions is done; in other words, a planing mill is established for furnishing dimensioned stock to the patternmaking department proper.

Fig. 6.—Top Floor of the Pattern Shop of the Mesta Machine Company.

The heavier patterns are made on a lower floor, which is on a level with the foundry floor. The three floors are each equipped with such machinery as is necessary to relieve the patternmaker of all operations that can be accomplished by the aid of machines. Wherever possible the motors are built into the machines. Each patternmaker is furnished with a bench trimmer and an electrical glue heater. Large trimmers are distributed through the shop where needed.

The new pattern shop at the Standard Cast Iron Pipe & Foundry Company of Bristol, Pa., was next illustrated. This building is lighted by windows on three sides. The patternmakers' benches are arranged

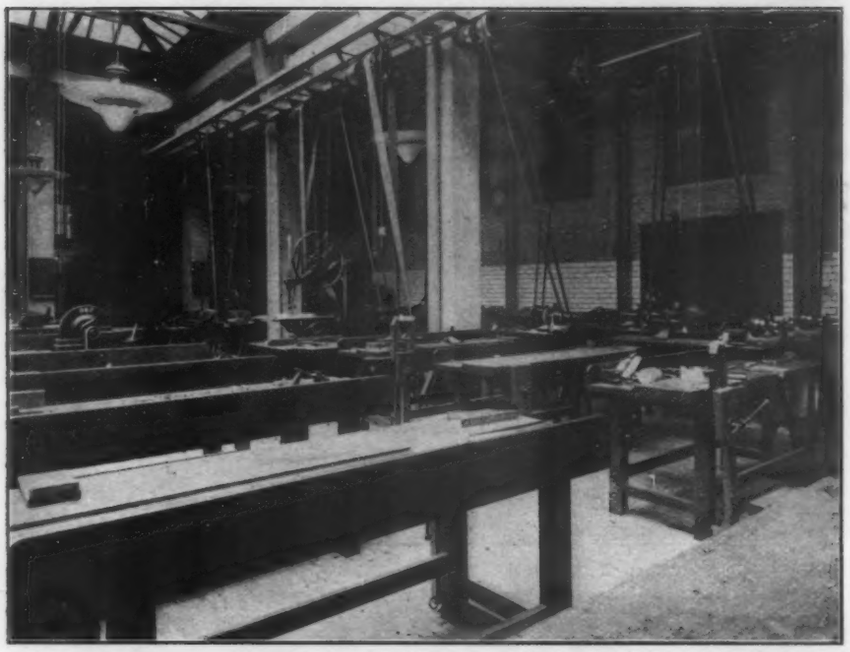


Fig. 7.—Pattern Department of the University of Pennsylvania, Philadelphia, Pa.

Fig. 8.—Toolroom in the Shops of the University of Pennsylvania.

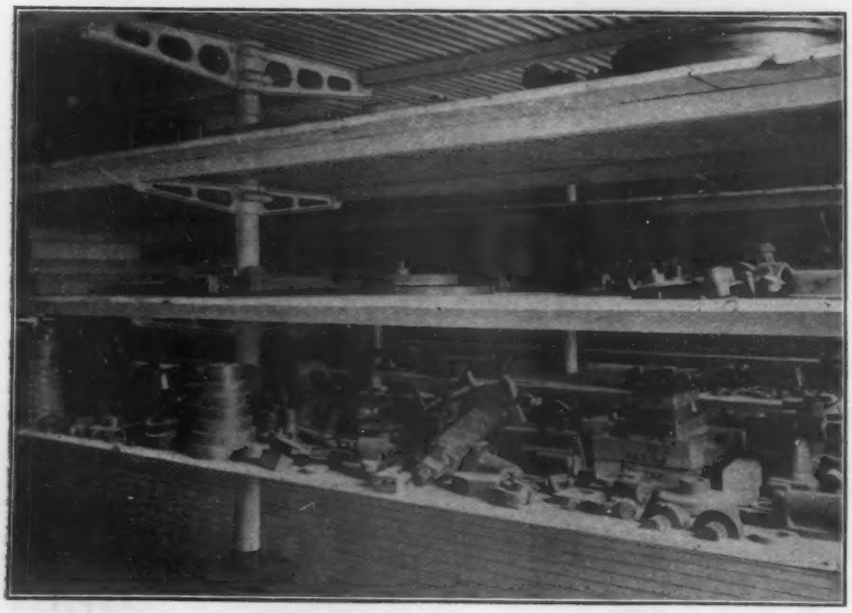


Fig. 9.—Pattern Storage of the Brown & Sharpe Mfg. Company, Providence, R. I.

around the walls and the machinery grouped in the center. One of the illustrations of this plant showed the Wadkin mechanical woodworker operating on a core box.

University of Pennsylvania.

Several views of the pattern department and allied departments of the University of Pennsylvania were given. In these shops the walls are constructed of brick and most of the light comes from skylights in the roof, as shown in Fig. 7. The departments are so arranged that the students in one can co-operate with those in the other. The drawing room adjoins the pattern shop, and the toolroom is arranged between the pattern shop and the machine shop. In the toolroom there is a series of cupboards containing shelves that are arranged along the center of the room, forming cross aisles between them. On one side of these cupboards are kept the woodworking tools for the pattern shop and the woodworking shop, while on the opposite side are kept the tools for the machine shop, Fig. 8.

Pattern Storage.

The subject of pattern storage was next taken up. Mr. Reinhard remarked that the shops which have a poor storage system do not seem particularly anxious to have it illustrated, and hence he showed only some views containing good features. The ground floor of the pattern storage of the Falk Company in Milwaukee was illustrated. In this case small patterns are kept in shelves or racks at one side and large patterns on the floor on the other side. Provision has been made for an overhead trolley system for carrying heavy patterns into or out of storage. The pattern storage department is constructed with brick walls and reinforced concrete floors. It is divided into several units by firewalls and all openings in the firewalls closed by self-closing doors. A very complete system is also maintained for checking out patterns, repairing them as they return from the foundry and recording the complete history of each.

A section of the storage room of the pattern shop of the Brown & Sharpe Mfg. Company, Providence, R. I., was next shown, Fig. 9. In this case the shelves are constructed of wood, but are supported on cast iron brackets clamped to iron columns.

The last view of this series illustrates the pattern storage in the new pattern department at the Navy Yard, Portsmouth, N. H., Fig. 10. This storage is constructed with brick walls, reinforced concrete floors

and pattern racks having iron frames and galvanized iron shelves, so that there is absolutely nothing in the room that could burn except the patterns.

Pattern Shop at Portsmouth Navy Yard.

The speaker then described the entire pattern shop equipment of the navy yard, showing an exterior view of the building, which is a brick structure, three stories high, 81 ft. in width and 200 ft. long. The first story is 20 ft. in the clear; the second, shown in Fig. 11, is 18 ft., and the third, to the ridge pole, 20 ft. In the center there is a firewall which divides the building into two parts. All of the openings in it are provided with self-closing fire-doors. The frame of the building is made of steel, fireproofed with concrete.

The work rooms on the first and second floors are supplied with thin hardwood floors laid over the concrete. All other floors are of concrete. On the third floor in the center are two openings 18 x 24 ft., which provide ventilation and also serve to transmit the light from skylights in the roof to the second floor. When a small force of men is employed the benches are placed around the wall in front of the windows, and when a larger force is required additional benches are placed in pairs, with their ends toward the windows. Two rooms in the building are set apart for pattern storage, one on the second and the other on the third floor. The toilet rooms are large and spacious, with tiling of faced brick 5 ft. high all around the room. These rooms are not under the stairs or in some dark corner, but where they have ample light and can be easily kept clean. The plant is heated by steam pipes on the side walls and also by coils of steam pipes overhead at the columns. The building is wired for electric light, there being seven large arc lamps in each workroom and two incandescents on extension arms over each bench. Through the center of the shop additional incandescents are hung over each machine. All the electric light wires pass through metal conduits placed in the floor or wall so that they are not in sight. An exhaust system serves to remove the shavings from the machines. This, together with the sprinkler system, was installed after the illustrations here shown were taken.

Fig. 10.—Pattern Storage in the Navy Yard at Portsmouth, N. H.

Fig. 11.—Second Floor of the Pattern Shop of the Portsmouth Navy Yard.

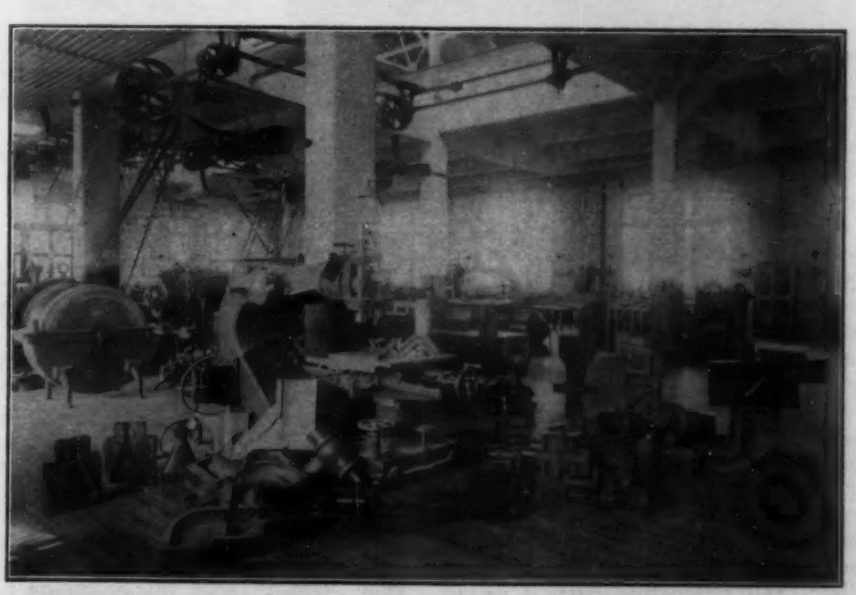


Fig. 12.—Patterns Made on Universal Woodworker at the Portsmouth Navy Yard.

Some interesting figures concerning this plant were given. The total cost of the shop was $116,000, and the machinery cost $30,000. The line of machines embraces some 28 tools. All the lathes are electrically driven by independent motors. On the first floor are

located the roughing tools which constitute the planing mill. These include a heavy 30-in. surfacer, a 20-in. rip saw table carrying saws 24 in. in diameter, a band resaw and lathe capable of swinging work 20 in. in diameter, a four-sided molder which cuts out lagging for building up large work, one cross cut saw, and one splitting saw for dimension work.

On the second floor two sets of machinery are installed, so as to eliminate the possibility of any men having to wait for a machine. The machines are also so located that any man can reach any machine by traveling the minimum distance from his bench. The equipment on this floor consists of speed lathes, large lathes, hand jointers, universal double saw tables, 24-in. surface planers, a pit lathe, a gap lathe and a mechanical woodworker. The Navy Department claims that the woodworker is doing excellent work, and in one

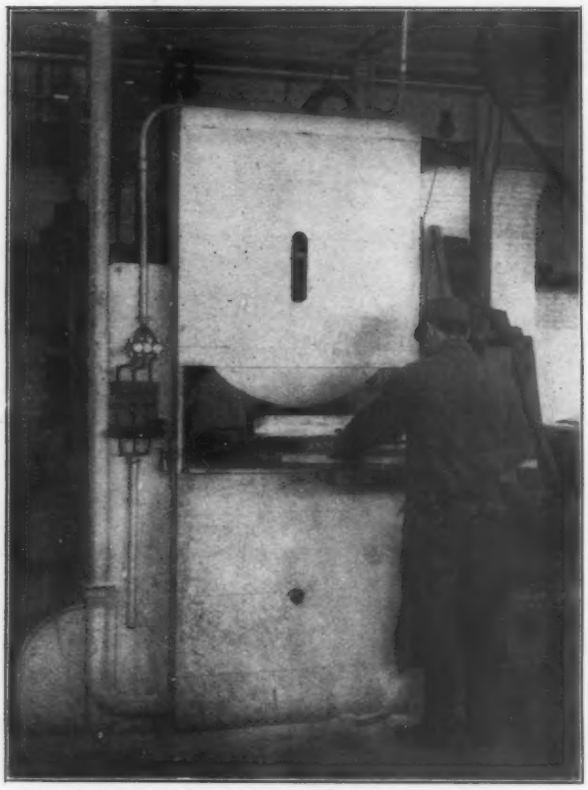


Fig. 13.—Method of Boxing Band Saw in Use at Brown & Sharpe Mfg. Company's Pattern Shop, Providence, R. I.

of the illustrations, Fig. 12, the machine was shown surrounded by a large number of core boxes and patterns which had been made upon it. Instances were cited in which patterns which had always taken from two to two and a half days to construct had been made on the machine in from four to six hours.

On the top floor of this plant a stock of pattern lumber is stored. The two openings between the second and third floors already referred to serve not only to ventilate the third floor but to allow the surplus heat to rise to the lumber racks, thus drying out the pattern lumber and keeping it sufficiently warm for curing purposes.

Next were shown a series of slides illustrating methods of connecting electrical motors to woodworking machines and also economical arrangements of machines in shops. These include the use of both direct and alternating current motors. One of the interesting devices shown is the iron surface table in use at the Portsmouth Navy Yard. This is made entirely of metal, the top measuring 66 in. in length and 30 in. in width. It is of cast iron, 1 in. thick, and heavily ribbed to eliminate the possibility of warping. It is supported on a three-point bearing, so that it can be adjusted and made perfectly level.

Safety Devices.

The speaker, after showing a series of views of the mechanical woodworker and various jobs turned out by it, came to the subject of safety devices for machines. Under this head were shown the method of boxing a band saw in use at the Brown & Sharpe Mfg. Company at Providence, R. I., Fig. 13. In this case the saw is completely boxed in and an exhaust arrangement provided for carrying away the sawdust. A view was also given of the rubber mat used before saws or other woodworking machines to prevent the workman from slipping. The safety cylinders for use on woodworkers were referred to and views given showing the results of accidents which had occurred with the old style standard and safety cylinders. The last view showed a general arrangement of piping for a glue heating system which would take care of the glue pots at all of the benches in the shop.

Equipment of a Model Pattern Shop.

Mr. Reinhard then gave his own ideas of the equipment of a model shop to employ 40 patternmakers. Among the principal points which he thought should be included are these: Ample provision for light from all sides, the location of a foreman's office near the middle of one side, a good lavatory and coat room placed in an open and accessible location, the finishing of the patterns in a separate department by employees who do nothing else, the machines to be so arranged as to reduce both work and the travel of the stock to a minimum.

The placing on each bench of an electric glue heater was recommended, also the placing of five large trimmers and five small bench hand jointers at such places as would be easily accessible to the men. For this number of men the speaker recommended four surface tables. All of the machines should be driven by individual electric motors and so placed as not to be in the way of each other or the work as it passes through. Provision should be made for several spaces of open floor for the construction of large patterns. Such an equipment was figured out and it was found that the machinery would cost $16,000. Against this investment are chargeable the following:

	Per cent.	
Interest on the investment	6	$960
Insurance	2	320
Depreciation	5	800
Power and maintenance	10	1,600
Totals	23	$3,680

which means that each year the extra expense incurred by the full equipment is $3680, or, to be generous, $4000.

The saving secured by such a full equipment, compared with the ordinary equipment that exists in many pattern shops to-day, was put at 25 per cent. at least on the cost of patterns. Assume that the cost of patterns consists of only the time of the patternmaker. Then the saving would consist of 25 per cent. of the wages of the patternmaker. Figuring the pay of patternmakers at but $16 per week would mean $33,280 annually for 40 men, the number for which this shop is designed. Twenty-five per cent. of this payroll means a gross saving of $8320 a year. Deduct from this $4000, which is the greatest possible annual expense incurred by such equipment, as above shown, and there is a net saving of $4320 every year.

The speaker also called attention to the various small tools and conveniences which could be used, including vises, racks for various supplies and all small stock which should be kept on hand. By having a regular place for this material much time can be saved in any shop.

The United States Senate has passed the Elkins resolution, reported from the Committee on Finance, authorizing an investigation by a special committee of seven Senators of the causes of the increase of prices.

The Pattern Shop of To-Day.*

BY JOSEPH LEON GOBEILLE, NIAGARA FALLS, N. Y.

This is a transition period in pattern making, as it is in the foundry business. The most curious thing about us humans is our indifference and unalertness to change. The telephone came and altered all accepted precedent; nobody noticed it. The automobile crop is right now of more value in dollars than that of cotton or gold. The flying machine will be common when next we meet. So with the venerated and venerable pattern shop. The molding machine is coming, mighty fast, too, and the old folly of setting a mechanic in wood to make a rigid model of some intricate casting which will be, not fabricated at all but, poured in liquid; this foolishness is about to depart along with "How to temper copper" and "Who was Cain's wife?"

The pattern shop of our boyhood had its traditions, but it has come to pass that the man most learned and expert in these days is really the least important thing in the pattern shop of to-day. Even now I see in the trade journals articles on obsolete subjects written and printed with a degree of seriousness that would make the fortune of a professional funny paper. "Gearing; How to Develop the Epycycloidol (or is it the Involute) Form of Tooth." Why, there is almost no gearing used in this country—everything goes by belts, ropes, friction or is "direct connected." Gearings of precision are cut any way, and a lot are not metal at all, only rawhide. So the pattern shop need not keep an expert gearmaker. Cast tooth gears from patterns are no longer called for, and if they were wanted we have a fine gear cutter more accurate than any mere man doing nothing most of the time.

Patterns Made of Concrete.

After fooling away a lot of time, I decided to add a separate department and make some patterns out of concrete. In an Italian imagemaker's shop on Chestnut street, Philadelphia, I found my man. He was "a artist," and was very much surprised and grieved when I started him on a housing to weight about 16,000 lb., instead of on a group of figures, Cupids, Psyches, &c., but my man was just a little different from the common or garden variety of pattern maker. He did not know it all, and he was a fine, honest worker. He furnished his own reinforcing; I learned since that in an old steel mattress which he picked up on the dump and hauled to the shop himself and a few feet of barbed wire appropriated from a chicken fence in the suburbs, he had procured the best kind of reinforcing and bothered nobody.

Now for the part that will interest you: A housing priced at a wage cost of $432 my Florentine friend got out for $71.60, and we made a good casting from it. I was paying him $9 a week, so, much to his surprise, I raised him to $2 a day, and he is now not afraid to tackle a water jacketed automobile cylinder or a cast-together tandem compound, core boxes and all. To get his water course and steam port section superficies he pours the core box with plaster, saws 1 in. sections from the cast and weighs these sections against 1 in. cubes of the same plaster used as weights on a common candy balance. It is obvious that the number of cubes necessary to balanace any slice represents the number of square inches of superficial area in that part, no matter how crooked or intricate the outline may be. So we built a dog house to our pattern shop and put into it this man with two helpers, who will themselves be experts in a year or two, on $6 and $7 per week, respectively.

Short Cuts in Pattern Making.

Now when so many molding machines are in use, it is desirable to short circuit working, not from the blue print to the pattern, but directly to the plate itself. Instead of all the expensive iron and brass patterns, with two shrinks to allow and the thousand chances for inaccuracy, we must arrive by carving or modeling the piece wanted in one shrink and working directly on to the plate. This in practice necessitates another dog house for a first-class white metal molder. It should adjoin the concrete man's room. I may confide in you to this extent: my plaster man was from Sunny Italy; my molder from the land of cakes. What a Scot will say out loud about a Dago and what a Florentine thinks about a Glasgow man are not suitable to put into words before this respectable company. What to do? Well, I didn't know. Finally I worked most of my plates with a Hungarian greenhorn in charge. He molded lovely plates, but was slow, and of course it was "unfair" to the molders' union.

Right here I might say that the greatest advantage of the public pattern shop is its nonconnection with a union molding shop. It is really surprising how easy it is to save, say, $100 wages cost out of your ordinary well run job. If I had for my profit what I could save by cutting under your costs I would finish the "Carnegie Technical" myself—by easy stages!

The Jolt Rammer.

One wonderful thing about present-day pattern shop practice is due to the rise of the jolt rammer. It is possible to handle boards 36 in. x 48 in. in at least one of the new machines and make anything at all, large or small. After two years' pretty close connection with the jarring type I am convinced of its entire practicability for small and light work and for stove plate, as well as for heavy castings. The man in charge must know how to run it, just as in everything else—the automobile, for example. The trouble with the jolt machine is that it needs common sense to get results, and common sense is scarce. Think a moment; that bump-bump-bump, 19 times, bumps something else beside the sand—flasks, bars, patterns. All catch it, and must be made with a degree of strength and accuracy not demanded elsewhere. Make your flasks of solid iron—no joints at corners. Make them absolutely interchangeable—tool steel pins ground to one-thousandth of an inch and fitting a one-thousandth of an inch tapered reamed hole—so accurately made that any cope will fit any drag.

Don't get it into your cosmos that the man running the machine needs any special mental endowment. I tried a mechanical engineer, graduate of a good technical school; no go. He couldn't even shake out cores in the old jolt rammer. So I hired a Russian who combined the trade of buttonhole maker with a physique which stamped him a veritable Vulcan. He was a greenhorn and spoke no language but Russian except a few Hebrew swear words. All the conversation I ever had with him was this bump-bump-bump-bump-bump-bump! He understood, and could even increase the number of jolts if his air was down 20 or 30 lb. without any profanity on my part. That was one qualification. The second was, he was so big and strong, so bearded and so fierce looking the molders were afraid to rough house his machine or him. Once when he lost a mold, because some molder had buried a sponge in his sand, he wrecked three of the foundry windows and broke two shovels with his hands. That was enough; Strosky never was called upon to jar ram any more sponges. I pacified him, but dreamed of buttonholes and wrecked foundries at intervals for weeks afterward.

The Jolt Rammer and Concrete Work Reduce Costs.

Another advantage of the jolt rammer in combination with the concrete man might be illustrated in this way: We wanted a shell-like casting for a gear case. We modeled this in clay and took an impression in plaster of the male side, which was to be our drag. We then made a reverse by processing, and poured a

* Read before the Pittsburgh Foundrymen's Association, February 7, 1910.

female from which we made our cope. These were poured in hardened concrete in an iron flask, allowed to dry, rammed up separately, put together and poured from hand ladles. We never had a pattern, but got a fine, perfect casting—size about 18 in. x 30 in. x 13 in. deep, 22 indentations, bosses and oil courses, irregular in shape, ⅜ in. thick, weight 228 lb., cost of pattern maker's time, $9.20, and all from blue print one-quarter size.

Another photograph from life: A certain 60-in. pipe bend, T-valve and end connection cost $628 and was destroyed by fire. The insurance companies settled. We replaced the patterns (from castings) in concrete for $52. The adjuster came round and saw the finished job. Here is what he said: "Does this stonework cost much more than cherry?" "No." "Not half as much again, does it?" "No." "Well, it's worth it; makes a harder pattern and can't burn," said the adjuster. But in that one item the poor unfortunate foundryman who had the fire sold out to the insurance company so as to take a clear profit of $576 in an investment of $52.

If your flasks are right you can get 100 castings from an ordinary concrete pattern and then make a new one for less than you could patch up, varnish and store a wood pattern. Believe me, the reinforced concrete pattern is a wonder. I have no monopoly of it. Buy a barrel of cement, collect an Italian and try it out for yourself.

The way to keep things even or to change work on the big jolt rammer is almost too simple for words, only it seems that nobody gets on to it. Make a standard plate for all small work, 12 in. x 16 in. That will be nine for each big board, 36 in. x 48 in. These multiples are interchangeable and bolted in place, so when one casting runs ahead take its multiple and replace with something else, or if it runs short, make an extra plate, substitute for something not pressing and double the output. Very simple, and this is now being worked in practice.

An Expanding Alloy Needed.

One word about alloys. There is now on sale in this town a metal that is practically nonshrinkable; but what the new era pattern shop wants awfully bad is a white alloy that will take solder and expand in cooling ⅛ in. instead of contracting that fraction. Think what that would do for you. A casting from a broken casting would make an absolutely accurate working pattern.

I have made in vain a hundred mixtures seeking this philosopher's stone. When it is discovered the stove founder will go into deep mourning, for patterns for repairs that will fit any given stove could be made from the casting itself or a new pattern stove duplicated in its entirety exactly right in size. Water expands thus in cooling: A cubic foot of water makes a nice plus in volume when it cools to ice. What else does? Especially what other material which combines with copper and aluminum?

Three Important Suggestions.

Finally, if you do not believe in radical changes I can suggest three things which will cut down your pattern expenses very materially:

1. Rearrangement of your tools. To-day in most pattern shops the tools are put in helter-skelter. A skilled workman will put in more time walking and carrying his lumber than in the actual operations involved. Change the disposition of your tools so that the natural operations may be sequential. Nearest the lumber racks place the cut-off saw; then the big jointer, the surfacer or pony planer; next your combination crosscut and rip saw, band saw, jig saw, segment cutter and your big trimmer in the order named and have one of the new toy jointers conveniently near the bench of every man. They are twice as helpful as any trimmer.

2. The second source of saving is in having a good foreman. A bright, ambitious young man just out of his time who has taken a course in mechanical drawing makes a splendid man for foreman. Do not select one who knows too much about pattern making or depend on him for carrying out intricate valves or cored work. He can hire men for 40 cents per hour who know all about such details. A young man right out of a good technical school makes a splendid foreman, and one who will get out work and keep accurate cost account of it.

3. My third suggestion is a careful division of labor. If you run more than 25 men you will be able to save more than 25 per cent. right at the start. Get a good turner and allow him to do nothing else. Get a good man on beds and housings, give him a gang of five men to help him and keep him at that and similar work all the time. The same with cylinders, small valves, parts, fittings, &c. Each man at what he can do best with cheap help will cut your average wage rate 15 cents per hour. Many of your men run big shops, in them nothing but the group or gang system—mill gang, dimension gang, assembling gang, finishing gang, varnishing gang.

Cylinder Lubrication.

Diversity of Results in Practice.

At the monthly meeting of the American Society of Mechanical Engineers, held January 11, 1910, when Prof. Charles F. Mabery gave the paper on "Lubrication and Lubricants," printed in *The Iron Age* January 20 and 27, 1910, an interesting discussion was contributed by Fred R. Low, editor of *Power and The Engineer*. Through the columns of that publication users of cylinder oils had been invited to submit data with regard to their practice and the replies from 81 are digested in the accompanying table. There is much food for thought in a careful study of this table. Its value lies in such a study and from the information there given the reader can best draw his own conclusions and lessons, better probably than if an extended review were to be given.

Some few facts may be mentioned in explanation, however. Remarkable differences are to be noticed in the cost per thousand estimated horsepower per hour, which will be seen to range from 0.47 cents as a minimum to 30 cents as a maximum, and in the amount of oil used per 1,000,000 sq. ft. of surface rubbed over per hour, ranging from 0.07 pint to 5.94 pints. While considerable variation in these values may be expected due to differences in the types of apparatus used, the speed of operation, the quality and pressure of the steam, the quality of the lubricant and the manner of its application, neither one nor all of these should account for quite such excesses as are to be noticed in several cases; in these there would seem to be an element of carelessness or ignorance, or both, on the part of those responsible.

Those who find the results in their own plants approximating the minimum ones given in the table may safely conclude that they are obtaining good economy in their use of cylinder oil. On the other hand, those who find that they are equaling or exceeding the larger values would do well to search out the trouble and remove it. Wet steam will aggravate the waste of oil, for the nonaffinity of water and oil would make it difficult to effectively lubricate a surface on which there is a considerable deposition of moisture. The remedy is to be found in efficient separators, or, better yet, for economy's sake, attention to the boilers that there may be less water carried over, and effective insulation of the steam pipes. It may be that a different way of introducing the oil would effect an economy. Some prefer to atomize the oil into the steam and let the latter be the means of carrying the lubricant directly into the cylinders. Others let it flow down the interior of the steam pipe to be washed along by the steam, and still others use force pumps to inject

the oil directly to the parts requiring lubrication, and so on. The choice of these must depend largely upon the conditions surrounding any particular case, but whatever the method in use, if the results are bad and no other reason can be found, a change to some other method would apparently be in order.

The condition of the cylinder's interior surface, if too smooth, for example, or the use of a character of oil that was intended for a different class of service, are other factors that conduce to a useless waste of oil. These and any of the countless others that could be enumerated well deserve investigation in the majority of plants when a typical census of the results of cylinder oil use, as given in this table, shows such a great disparity even between approximately equivalent conditions of use.

No.	Estimated Horse-power.	Description of Engine.	Cylinders.	Stroke.	Revolutions per Minute.	Steam Pressure.	Sq. Ft. Rubbed Over per Hour.	Oil Used. Name or Description.	Price per Gal.	Amount Used per Hr., Pints.	Cost per Hr., Cents.	Pints per Estimated 1000 H. P. Hours.	Cents per Estimated 1000 H.P. Hours.	Pints per Million Sq. Ft. Rubbed Over.
1	1,350	Corliss triple expansion	30–34–52	60	65		1,084,000	No. 725 cyl. comp.	28c.	0·769	2.42	0.511	1.79	0.636
2	675	H. P. 26		48	81		595,800	Capitol oil	35c.	0·666	4.37	0.69	6.46	1.78
3	675	Cross compound		48	81		595,800	No. 650 dark valve cyl.	50c.	0·666	2.91	0.99	4.33	1.25
4	975	L. P. 52		48	81		595,800		50c.	0·104	0.65	0.107	0.67	0.147
5	975	Cross comp. St. Louis Corliss		48	81	140	706,500		50c.	0·621	2.17	0.839	2.23	0.89
6	650	Corliss compound	24–44	60	65		694,500		28c.	0·21	1.57	0.323	2.42	0.33
7	650	Hamilton Corliss cross comp.	20–36	44	100	140 100# sup.	644,400	{Oil of beeswax; 600 fire test cyl. stock & acidless tallow.}	90c.	0·255	2.87	0.392	0.40	
8	675	Corliss compound	18–34	48	85		555,900	Heavy body comp.	28c.	0·465	1.63	0.81	2.84	0.84
9	875	Corliss tandem compound	24–42	48	65	110	539,600	600 W.	40c.	0·2	1.00	0.229	1.14	0.57
10	450	Russell cross compound	16–30	24	150		433,300	Improved high pressure cyl.	60c.	0·25	1.87	0.555	4.16	0.38
11	650	Cross comp. condensing	18–36	42	72		428,100	Best grade cyl.	75c.	0·111		0.171		0.26
12	290	{Cross compound	H. P. 18	36	96	120	146,000	Best grade cyl.	60c.	0·323	4.34	2.22	15.80	4.42
13	290	H. P. 16		36	96	120	210,000	Harris H.P. valve.	60c.	0·184	2.42	1.11	8.32	4.17
14	290	Harris standard cross comp.	L. P. 28	18	200	110	150,800	Rarus.	60c.	0·131	1.38	0.92	6.90	1.22
15	400	Cross compound, St. Louis Corliss		18	200		263,900	No. 650 dark valve.		0·09		0.65		0.50
16	450	Corliss cross comp.	14–28	42	84		393,000	"600 W."	50c.	0·417	0.56	0.225	1.41	0.23
17	450	Russell tandem comp.	18–30	36	84		380,000	"600 W."	60c.	0·167	3.13	0.927	6.95	1.10
18	290	Phoenix Iron Works	14–24	18	210		376,100		43c.	0·167	0.90	0.88	3.10	0.44
19	290	Russell tandem comp.	13–20½	20	210		368,200	"600 W."	60c.	0·167	1.25	0.835	6.25	0.45
20	225	{Corliss cross compound	H.P. 16	36	84	130	126,800	Best grade cyl.	60c.	0·945	4.34	2.98	21.45	5.10
21	225	L.P. 30		36	84		227,500	Best grade cyl.	60c.	0·323	2.82	1.43	10.33	1.80
22	450	Buckeye tandem comp.	12–21	21	200		363,100	"600 W."	60c.	0·167	1.67	0.459	4.72	0.55
23	450	Ingersoll cross compound	16–30	21	200		202,000	"600 W."	60c.	0·273	1.25	0.371	2.78	0.53
24	290	American ball compound	10½–20½	12	300		259,300			0·083		0.365		0.98
25	160	Westinghouse automatic comp	11–18	11	163	115	175,400	No. 725 cyl. comp.	75c.	0·012	0.078	0.461	4.32	0.32
26	160	Tandem comp. piston valve	10½–18	18	115	115	172,100	Best high grade mineral.	50c.	0·037	0.075	0.231	0.47	0.75
27	70	Ingersoll cross comp.	8–12	12	150		94,300	High grade mineral.	50c.	0·083	0.23	0.255	1.44	0.21
28	450	Piston valve	30	48	95	150	357,800	"600 W."	60c.	0·417	0.62	1.185	8.89	0.88
29	450	Double eccentric Corliss		48	84	150	318,000	"Cyl. oil No. 10."	25c.		1.30	0.927	2.90	1.16
30	290	Corliss	24	48	102		308,100	"Cyl. oil No. 10."	25c.	0·6	1.56	0.314	3.47	1.57
31	290	Harris Corliss	24	48	100	120	302,000			0·091		0.314		0.29
32	290		20	44	100		295,200			0·091		0.274		0.30
33	290	Greene	20	44	100		290,200	"600 W."	60c.	0·125*	0.94	0.455	5.56	1.39
34	290	Sioux Corliss	18	48	85		196,200			0·19		0.655		0.60
35	160	Harris Corliss	24	36	102	150	192,200	"Cyl. oil No. 10."	25c.	0·167	0.52	0.835	2.61	0.67
36	290	Erie	20	36	125	110	188,800	Harris high-press. valve.	60c.	0·118	0.88	0.906	6.81	0.63
37	250	New Brown	16	30	110	110	183,500	Buckeye cyl.	28c.	0·15	0.525	0.600	2.1	0.82
38	160	Atlas single valve automatic	22½	30	105		173,700	Capitol oil.	35c.	0·22	0.96	1.375	6.00	1.27
39	160	Ames	18	36	125	115	169,800	High grade mineral.	50c.	0·1	1.12	0.625	7.04	0.59
40	160	Corliss	16	36	100	115	167,900	High grade mineral.	50c.	0·015	0.094	0.115	0.72	0.069
41	130	High speed automatic	16	16	250	115	167,800	Light colored oil.	50c.	0·22	0.14	0.169	1.06	0.13
42	130	High speed automatic	16	16	250	80	161,500	Capitol.	35c.	0·83		0.769		0.19
43	130	Piston valve engine	16	16	220	85	158,900		35c.	0·138	0.44	0.789	3.36	0.63
44	130	Side valve throttling governor	17½	30	275	95	158,200	Rarus cyl.	28c.	0·094	0.46	1.15	4.02	0.88
45	120	Single valve auto. Fitchburg	15	14	275	125	155,900	Harris std. grade.	60c.	0·15	1.12	1.153	8.64	0.90
46	120	Atlas valve.	15½	15	220	85	150,900	Compounded oil	43c.	0·15	0.81	1.153	8.30	0.90
47	130	Harris Corliss	16	36	100		146,600	Model cyl.		0·045		0.45		1.02
48	100		14	14	280		143,200	"Eureka cyl."		0·105		0.437		0.21
49	240		22	23	106		140,500	Capitol	35c.	0·125	0.55	0.781	3.41	0.75
50	166	Wright Corliss	16	42	70	85	138,800	Valvaline	75c.	0·3	1.87	1.538	14.25	0.90
51	130	Nordberg Corliss	16	36	280	125	135,800	"600 W"	60c.	0·15	1.12	1.15	11.22	1.07
52	130	Robt. Armstrong automatic	16	14	73		133,500		28c.	0·138	0.46	1.061	13.71	1.04
53	130	Corliss	16	42	100		132,100			0·06		0.6	4.50	0.45
54	100	Slide valve	14	30	85	80	125,800	"600 W"	60c.	0·03	0.45	0.09		0.14
55	200	Corliss	20	36	85		120,200			0·018		0.187		0.25
56	100	Variable speed, St. Louis Corliss	18	36	90	125–140	118,800	"600 W"	60c.	0·03	0.22	0.45	1.46	0.38
57	83	Atlas automatic	14	14	190	125	116,800	No. 650 dark valve cyl.	50c.	0·045	0.26	0.788	2.82	0.57
58	110	Ames	15	14	212		116,600	"600 W." vacuum cyl.	60c.	0·067	0.50	1.0	5.90	0.94
59	100	Automatic piston valve	14	14	223		114,500	Capitol	35c.	0·11	0.48	1.428	4.37	1.09
60	130	Nordberg Corliss	16	33	83	110	113,800	High grade heavy	50c.	0·125	0.78	1.785	7.8	1.01
61	70	Ideal	12	21	300	100	113,100	Dark heavy cyl. with graph.		0·115		1.25		0.73
62	70	Buckeye	12	21	145		105,900	Capitol cyl.	35c.	0·083	0.36	0.985	5.18	0.78
63	100	Corliss	14	24	180		101,800			0·049		0.49		0.47
64	72	Atlas single valve automatic	12	16	180	110 very wet	101,800	Buckeye cyl.	28c.	0·0835	2.1	0.87	20.0	0.82
65	72	Corliss	12	16	180		99,500	Capitol cyl.	35c.	0·3		1.19		0.94
66	72	Corliss	12	16	85	100	98,350	No. 650 dark valve cyl.	50c.	0·045	0.26	2.857	12.48	2.01
67	72	St. Louis Corliss	12	16	90	125–140	96,500	Franklin oil	75c.	0·1	0.56	0.643	4.01	0.47
68	72	New Brown	12	16	90	80	96,400	Capitol cyl.	35c.	0·055	0.24	1.428	13.28	1.04
69	72		10	14	280	80	95,400	Capitol cyl.	35c.	0·2	0.84	4.81	4.81	0.55
70	72	Atlas	10	14	280	80	95,400	W. P. Miller's cyl. comp.	75c.	0·04	0.37	0.74	6.74	0.78
71	72	McEwen	10	14	280	80	94,400		35c.	0·055	0.27	2.0	7.49	0.93
72	72	Fitchburg	10	14	100	80	94,400	Flake graph. with eng. oil	45c.	0·065	0.31	0.786	4.43	0.98
73	72	Slide valve	12	14	210	140	82,700			0·167		1.185		0.90
74	72	Ball	12	12	280		74,400	Primo oil	60c.	0·045	0.34	4.175	9.75	0.97
75	72	Atlas	10	12	170		64,800			0·083		0.9		1.60
76	72	Corliss	10	12	103	100	60,900			0·125	0.94	1.66	11.03	2.05
77	72	Center crank	10	12	280	100	51,410	Premium valve oil	60c.	0·001		1.47		1.24
78	72	Slide-valve	10	12	280	100						1.82		2.90
										Averages		1.014	6.19	0.97

Gasoline Railroad Cars.—In railroad operation the field for this type of car is increasing in importance according to the *Engineering Record*. Recent experience has tended to show that such cars are particularly adapted for branch lines, which are not in a condition for immediate electrification, and are now being operated by steam at a loss. This is also true of electrically operated lines where the conditions are somewhat adverse. For inspection and repair cars this equipment is especially suitable, and it may also be used advantageously as a substitute for electric cars when the traffic is very light, thus permitting the power house and substations to shut down.

The Allegheny County Light Company, Pittsburgh, has closed a contract with the Carnegie Steel Company to furnish electric power for the shears, cranes and punching machinery for its new warehouse now under erection at Twelfth and Pike streets, in that city.

THE IRON ORES OF NEW YORK STATE.*

A General Survey of the Various Districts and the Character of the Deposits—Magnetite of the Lake Champlain District.

BY S. NORTON.

It would seem to me, after an experience of nearly 20 years in mining and using the ores of New York State, that the resources of the State in iron ore are little understood or appreciated. While these ores have been mined for a great many years and some enterprises in the iron industry originated in New York State, the discovery of large masses of ore in the Lake Superior region called the attention of the great iron masters away from the eastern iron ore deposits to the western. In conjunction with lake ores the location of large quantities of high grade metallurgical fuel in the vicinity of Pittsburgh has built up an iron and steel industry in that vicinity which is simply the wonder of the world. But at present we read a great deal in the papers in regard to the conservation of the natural resources of this country. Therefore our attention is called to the resources of this old and settled district in the East, as bearing on its ability in the future to supply the people living in tributary districts with iron and steel in its various forms sufficient for the needs of modern civilization.

Fig. 1.—Outcrop of No. 21 Magnetite Mine at Mineville, N. Y.

Southern New York Ores.

The iron ores of New York State are distributed from the southern part of the State, across the eastern end almost up to the Canadian boundary line. There is also a general extension through the central part of the State as far as the Genesee River. We begin descriptively with the deposits of ore on Staten Island, which, while small, at one time produced quite a tonnage of ore in comparison with the needs of the country. We find there a brown hematite ore which is simply a surface deposit formed in some manner on an underlying serpentine rock. This is very similar in appearance and formation to the large deposits of ore which are now being worked on the northern coast of Cuba. I mention this deposit more as a geological curiosity than for its commercial value.

As we come north in Orange County where it borders on the iron ore regions of New Jersey, we find a large area of the old gneissoid rocks which are ore bearing and carry more or less deposits of magnetite. These gneiss rocks extend across the New Jersey border through Orange County, and then across the Hudson River at Fort Montgomery and Peekskill and so on through Putnam County. These deposits have been worked for many years in various places. The Sterling mine at Lakeville in Orange County, and in the same county back of Fort Montgomery the Forest of Dean mine, 5 miles from the Hudson River, are two very old and well-known deposits of magnetite which have been worked for years.

Brown Hematites East of the Hudson River.

Crossing the Hudson River and back of Peekskill there are large deposits of iron ore bearing rocks which are peculiair to their location. The iron in these rocks is in two forms: magnetite and an aluminate of iron. Some years ago I experimented with this ore by magnetically separating the magnetite from the aluminate of iron. I sent the aluminate tailings to Ladoux & Co., who analyzed and classified the tailings from this material as equal in hardness and quality to the best Turkish emery. I do not know that anything has ever been done in regard to this matter and only speak of it as one of the most interesting probabilities in regard to the locality. Farther east on this same range there have been worked the Mahopac mines and the Tilly Foster, and there are said to be large deposits of lean ore in the vicinity of Brewster. It is of particular interest in regard to this

* Synopsis of an address before the Society of Engineers of Eastern New York at Troy, N. Y., February 9, 1910. Mr. Norton is general manager of Witherbee, Sherman & Co., Inc., Mineville, N. Y.

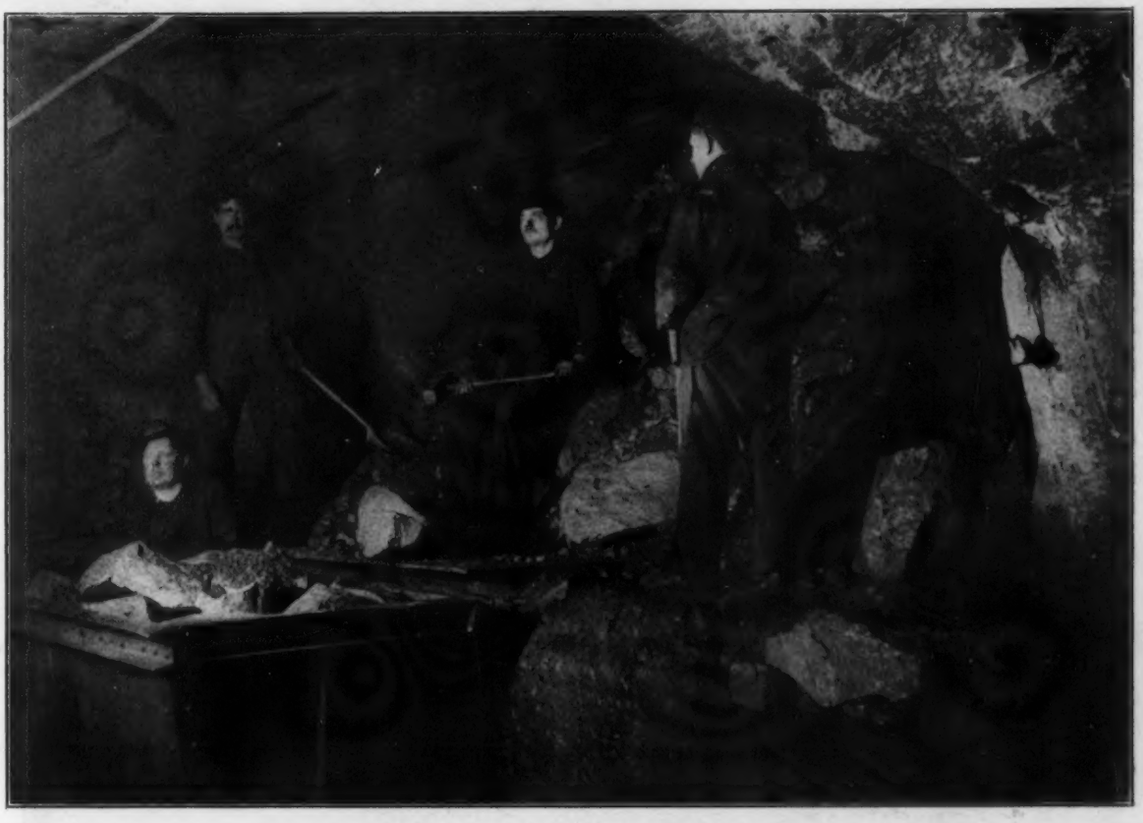


Fig. 2.—Loading Car at Mineville, N. Y., Magnetite Mines.

region that the ores, so far as they have been worked west of the Hudson River, are comparatively high in phosphorus, while those that have been worked east of the Hudson River are low in phosphorus and have been used in the manufacture of Bessemer steel.

This range covers quite a large area, but has never been exhaustively examined as regards its ability to produce ore with modern machinery and under modern conditions. Undoubtedly some time in the future, if the price of iron ore will warrant, there will be more or less ore from this range. North of Putnam County in the counties of Dutchess and Columbia, scattered through the Harlem Valley and also on the west slope of the Winchell Mountains for a number of miles, there are large, well known and well defined deposits of brown hematite ore which have been worked more or less for a great many years. This ore is a hydrated sesquioxide of iron, and is deposited as a rule between the slates and the limestone. As at a great many points carbonate of iron has been found mixed with the ore, it is reasonable to suppose that the latter has been formed by some process of precipitation. These deposits are well defined and there is no doubt in regard to the geographical extent. There is also no doubt in regard to the quality of the iron which has been made from the brown hematite. In fact, the very strongest car wheel iron, which to-day stands higher than any other in the market of the world, is what is known as Salisbury car wheel iron.

In past years the drawback to this district has

Fig. 3.—Power Drill at Work in Magnetite.

been its undeveloped transportation facilities, as it was impossible to reach consuming interests at any reasonable freight rate. The physical appearance of this deposit also precludes the possibility of what might be called cheap mining. Very few if any of these deposits are of such an extent as to be worked to any great depth as open cut propositions. The ore is deposited in masses of ocher clay and it is necessary

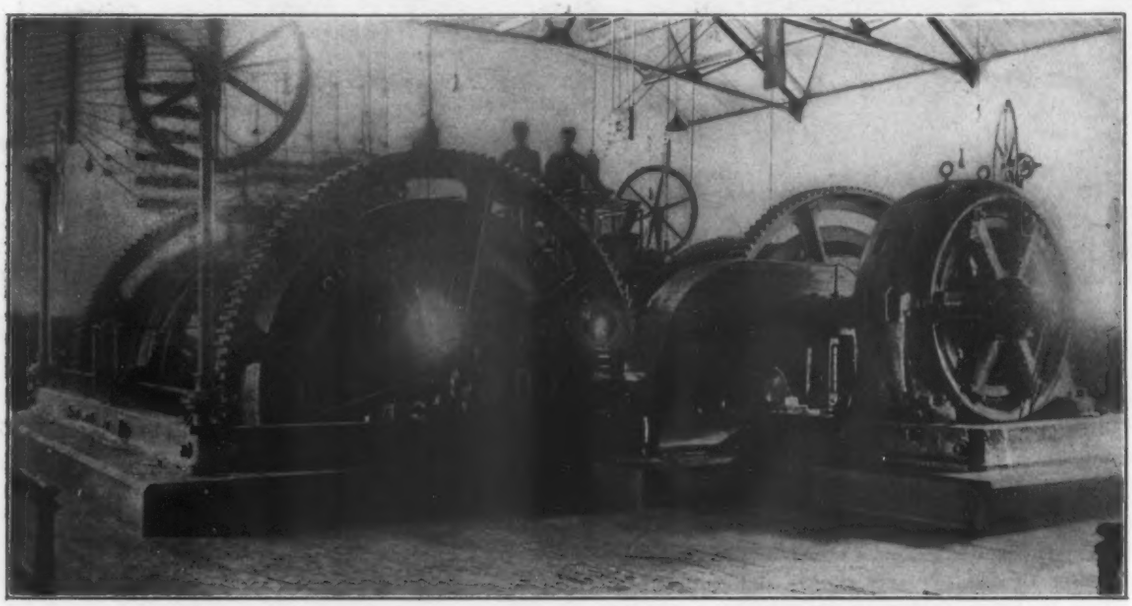


Fig. 4.—Electric Hoist at Harmony Mines, Mineville, N. Y., Driven by 300-Hp. Motor.

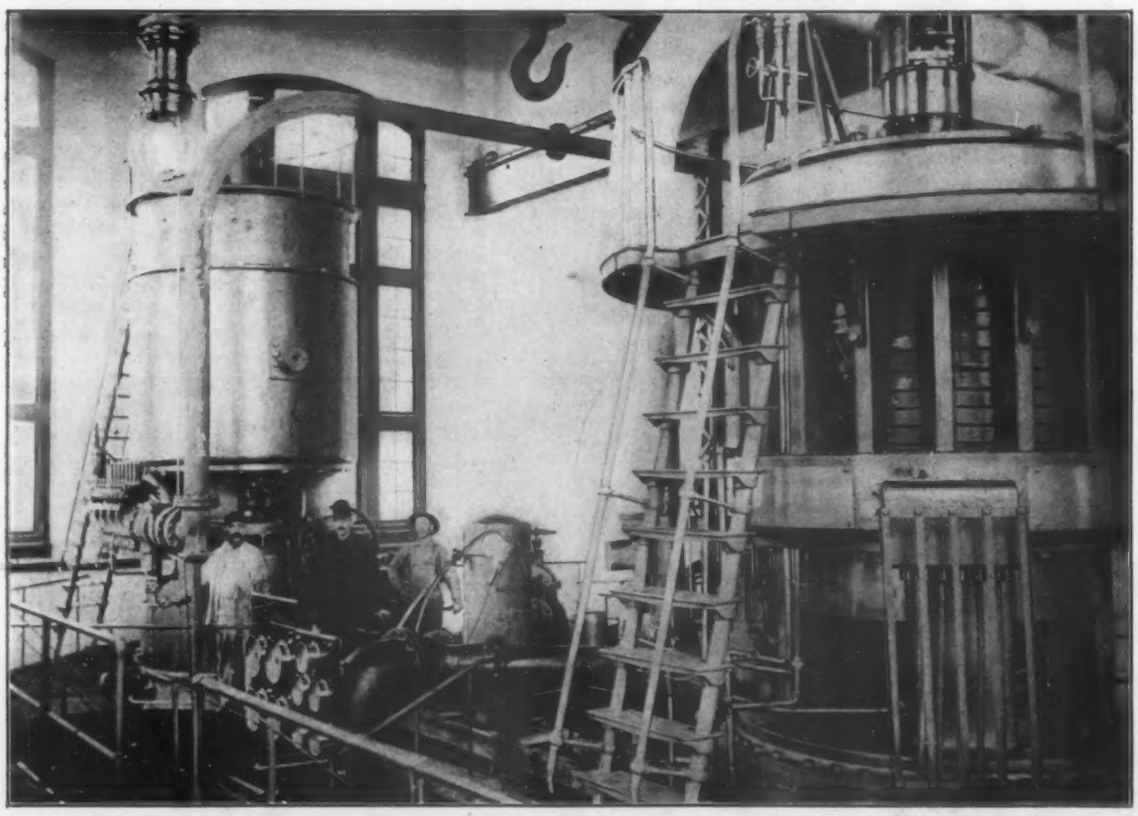


Fig. 5.—Curtiss Turbines at Port Henry, N. Y., Power Plant of Witherbee, Sherman & Co., Developing 2300 Kw.

to wash all of the material so as to free it from its impurities. The great body of this ore eventually will have to be recovered by some method of underground working—some modification of what is known as the "slicing and caving system." While these ores have been worked for so many years, there is not to my knowledge any single deposit which has ever shown any sign of having reached the bottom of the formation. The tonnage of ore from these counties east of the Hudson, if the price would warrant, could be made quite an important matter in the iron industry of the State. There would be no trouble in producing from 600,000 to 800,000 tons of ore per year, and this ore mixed with the magnetites of the State in the ordinary coke blast furnace will make a pig iron which, for the manufacture of ordinary run of castings and especially for stove plate and similar castings, has no superior in the world. And it is certainly not unreasonable to suppose that some time these deposits of iron will be worked, and that the physical difficulties which now enter into the problem will be overcome by the progressive young engineers who are coming on the stage.

Clinton Ores.

Leaving the brown hematite, the next group which demands our attention consists of Clinton ore—a red hematite which has been mined at a number of points from Utica west as far as the Genesee River. Geolog-

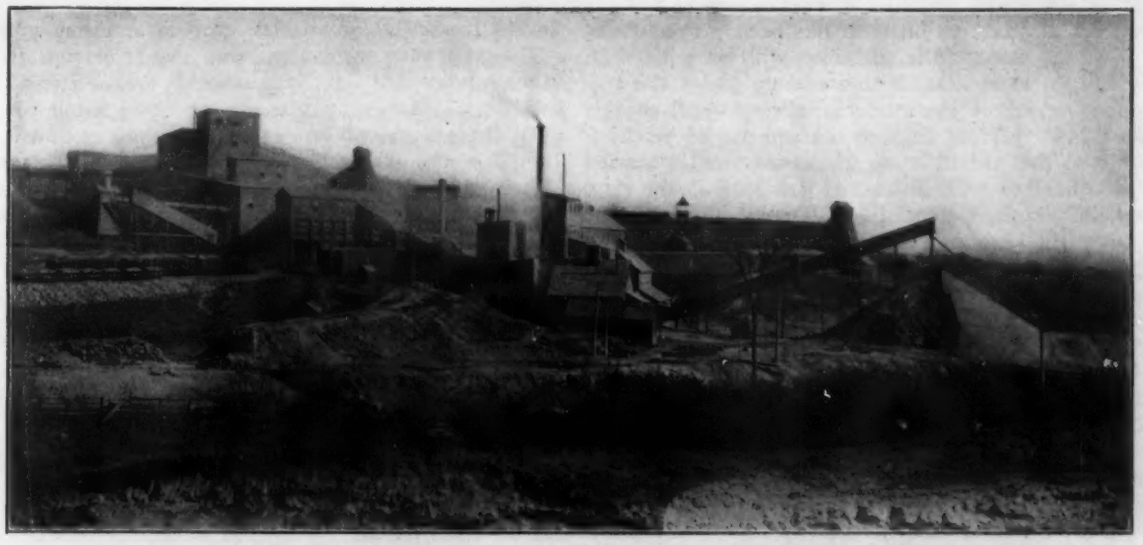


Fig. 6.—Nos. 1 and 2 Concentrating Mills at Mineville.—A Third Plant Is Now Under Construction.

ical research has shown this to be practically a continuous sheet of ore for at least 150 miles; and as the central part of New York sloping to the south is practically an unbroken plain and not crossed by any faults or breaks that are extensive, we have every reason to believe that there are hundreds of square miles of territory in this State which are underlaid with this red hematite. This deposit so far has never proved to be of any great thickness, but the acreage covered is so large that the probabilities are great that there will be found within this area many basins where the ore may thicken to a workable extent even at present prices of ore.

I believe it is not at all visionary to suppose that at some time this body of Clinton ore will produce a large quantity of the iron which will be required to supply the needs of the future inhabitants of this State. This belief is made stronger by my experience in the anthracite coal regions of Pennsylvania. Forty years ago it was thought impossible to mine even a 4-ft. vein of coal at a profit; and to-day veins 2 ft. in thickness are being mined in this same region. It is reasonable to suppose, therefore, that the young engineers of to-day will have brains enough to devise methods whereby even these thin deposits of ore, having extensive areas nearly level, will be mined at a cost which will make them of commercial value.

Potsdam Ores of St. Lawrence County.

The next deposit to demand our attention is the Potsdam, situated in St. Lawrence County. These ores have been worked extensively and have never, to my knowledge, been prospected as they should be. There are large bodies of ore there which at some future time can be used for the needs of the people of the State of New York in conjunction with the magnetic ores which will be won from the Adirondack mineral bearing rock.

Western, Central and Northern Adirondack Ores.

We now come to the Adirondack region, which we will divide for convenience into four different fields. On the western slope of the Adirondacks are a number of deposits which, while they are low in iron, are at the surface and can be mined by quarrying methods. They are to-day being operated and can be made to produce a large quantity of ore running 62 or 63 per cent. in iron. Unfortunately most of the ores on the western slope carry more or less sulphur and at the same time have a very fine crystalline structure. Therefore they require fine grinding before the magnetite can be separated from the gangue to prepare them for the furnace. Still the deposits are very large and undoubtedly the difficulties can be overcome by energy and technical skill.

The second field comprises the central part of the Adirondack Mountains, where there are large areas of what are known as "gabbro rocks." These carry more or less iron ore which investigation has shown to be a mixture of magnetite and ilmenite. It has been proven conclusively that the ilmenite can be eliminated by magnetic separation to such a point that these ores can be utilized in the blast furnace. It has also been demonstrated in the past few months by the electric furnace that the ilmenite in the future will have a value fully as great as the magnetite in this ore, as

Fig. 7.—Concrete Cottages Built at Mineville, N. Y., Tailings from Magnetic Concentration Forming the Aggregate.

the effect of titanium on steel has been proven to be so advantageous that it certainly will be utilized in producing a steel suitable to stand up under the tremendous traffic of the modern railroad. All that is needed is to perfect further the process of smelting the ore so that the titanium of the ilmenite is carried into the finished steel instead of going off in the slag. Then the titanium, instead of lessening the value of the ore, will be one of its greatest advantages. The largest deposits of this material is near Lake Sanford, where there are millions of tons which are only waiting the means of transportation to become a factor in the iron and steel business.

On the northern slope of the Adirondacks there are numerous deposits of magnetite lean in iron so far as the natural deposits are concerned, but which have the special property of being extremely low in phosphorus. While these ores probably never will be won at a low cost, the ore which is finally shipped from this region, after having been treated by magnetic separation, is probably the purest ore of iron and freest from deleterious materials of any in the world. It will be used in the manufacture of high grade specialties which the future will require.

The Lake Champlain District.

We now come to the eastern slope of the Adirondack Mountains, bordering on Lake Champlain, which is probably the best known iron ore mining district in the East. Port Henry enjoys the distinction, according to high authority in railroad affairs, of originating more tons of freight than any other place in the State. Here from a group of mines in a small area have been mined large quantities of ore for many years. The area controlled by the largest company, Witherbee, Sherman & Co., Inc., is about 15,000 acres. After all these years and the shipment from this district of from 15,000,000 to 16,000,000 tons, the greater part of the area remains undeveloped. The difficulties which confronted the owners of this property a few years ago were enough to have discouraged any one excepting the man who at that time passed to the head of this enterprise. To F. S. Witherbee, president of Witherbee, Sherman & Co., cannot be given too much credit for the energy with which he has met one difficulty after another, until to-day there is situated on the shores of Lake Champlain the largest iron ore mining enterprise in the East. Further, it is the most up to date and best equipped iron mine to-day in the world. The methods which have been worked out for overcoming the difficulties incident to high phosphorus ore, and also to successfully treating low grade lean ore, have been so satisfactory that to-day these mines and mills are visited by engineers of world-wide reputation, not only from this country but also from England, Germany and Sweden, that they might see how the work was carried on. The ores at Mineville at the present time are being handled in quantities which are much greater than in the past, and at the same time the prospecting has been kept in advance of the workings, so that while in the last few years the tonnage has been four times what it used to be, the amount of ore in sight has kept pace with the increased tonnage.

There is one more point in regard to the great Adirondack magnetite formation to which I wish to call your attention. In the Great Lakes region there are large masses of lean hematite ores which are no more or less than silicates of iron and alumina, or, in other words, they are chemical combinations of these minerals. In the Adirondacks, while the ore may be lean, so far as the analysis would show, the iron is scattered through the gangue in crystals of pure magnetite, which when recovered are a pure oxide of iron. Therefore, in the farther future the resources of the Adirondack region and its ability to produce 60 to 65 per cent. iron ore simply depend upon what the market value of the ore may be and how many tons of lean ore it is possible to grind up to recover the magnetite. If what I have seen in the past should be repeated in the future, and pig iron should bring $30 a ton, which would mean practically about $9 a ton for the ore, there is enough crude material which at that figure could be used to produce from the Adirondack region alone more 60 per cent. ore than the whole estimated ore reserves at present known in this United States.

It is easily seen from what has been stated above that the whole subject of the iron ores of New York State is one that no man and no one generation will see completely worked out in its technical and commercial details. One thing certain is that the State of New York has within its own borders enough iron ore to supply the needs of its people for years to come.

Views of Operations at Mineville.

Mr. Norton's address was illustrated by lantern slides from photographs taken at the magnetite mines and concentrating works of Witherbee, Sherman & Co. at Mineville. These properties and their equipment were fully described in an article in *The Iron Age* of December 17, 1903. In the intervening years much important new work has been done, both in the development of the deposits and the improvement of methods and equipment. The result is that to-day the mines in the Port Henry District are producing at the rate of 1,000,000 tons of high grade ore, and the Mineville mines represent a larger use of electrical equipment than any other iron mines in the country, electricity being applied to hoisting, tramming, pumping, air compression and underground lighting. Reference has been made from time to time to the new installations at Mineville and Port Henry, including the large expenditures for power, particularly at the steam turbine station at Port Henry. At present the concentrating plant is being increased by the construction of a third mill at Mineville.

From Mr. Norton's views we have selected a few which are representative. Fig. 1 shows the outcrop of what is known as the Old Bed vein at the No. 21 mine of the Port Henry Ore Company. This vein is from 50 to 400 ft. thick and the deposit is worked through three mines in addition to No. 21; namely, the Old Bed, Joker and Bonanza mines of Witherbee, Sherman & Co. The latter also handle the product of the Port Henry Ore Company, the two organizations having close relations. Fig. 1 shows the magnitude of the Old Bed vein and the pillars, some of the latter being 60 ft. high and 30 ft. in diameter. Mining from the open pit dates from 1876, when the surface was stripped. The pillars in this group of mines are estimated to contain 800,000 tons. Consideration has been given to the employment of concrete pillars in case the ore pillars are removed.

Figs. 2 and 3 illustrate the character of the ore as now being worked in the underground operations at Mineville. On the lower level of the Old Bed deposit the drift is in the form of an ellipse and electric tramming has been introduced. At the foot of the Joker shaft is a bin cut out of the rock, having a capacity of 1000 tons of ore. A rotary tipple, electrically operated, is located over this bin and the contents of three ore cars of 3 tons capacity each are dropped into the bin at once.

Fig. 4 shows the electric hoist in the power house for the Harmony mines. It is of the four-drum type and is driven by a 300-hp. electric motor. The skips are of 3 tons capacity and travel at the rate of 600 ft. per minute. In the same building are five electrically driven compressors, with a total output of 10,000 cu. ft. of free air per minute. In Fig. 5 is a view of the Curtis vertical steam turbine plant at Port Henry which furnishes a large part of the electric power used at Mineville, as well as that for the Cheever mine, 2 miles north of Port Henry. There is one 800 kw.

turbine, operating at 5600 volts, and one 1500 kw. turbine, operating at 6600 volts. On both turbines 165 lb. steam pressure is used and 100 degrees superheat. It is the intention to add to the installation at the Mineville central power house a low pressure Curtis turbine which will increase the electric power generated there from 750 kw. to 1500 kw.

Fig. 6 gives a view of the No. 1 and No. 2 concentrating plants at Mineville, the equipment and operation of which have been described in *The Iron Age*, the article of December 17, 1903, being supplemented by a description of later installations published in the issue of October 5, 1905.

Fig. 7 illustrates an interesting development at Mineville—the building of concrete houses in place of wooden buildings. The mining company has thousands of acres of timber lands and lumber was the cheapest building material until recently. Nearly all the important buildings on the company's property, including its main office building, are of concrete, and more than 50 workingmen's houses of concrete have been erected. The tailings from the concentrating plant make an excellent aggregate, and when cement is used in the ratio of 1 to 5, with no sand or gravel, the result is an unusually strong concrete block. It is probable that no more permanent structures of wood will be built at Mineville and thus in time, as wooden buildings are displaced, it will be practically given over to concrete construction. While the cost of workingmen's houses in concrete is nearly the same as in wood, the much lower cost of maintenance and the fact of being indestructible by fire make a pronounced ultimate economy. Retaining walls have been made from cement and tailings in the ratio of 1 to 20, while excellent roads have been built of 1 to 9 and other mixtures ranging to 1 to 16. Several miles of roads and sidewalks have been so built at Port Henry and Mineville and the expense of roadmaking has been reduced below that of macadam. Shipments of the tailings have been made to other points for concrete work in view of the excellent results secured with them, the price f.o.b. Mineville being about 30 cents a ton. The analysis of the tailings shows 13.14 per cent. iron, 3.47 per cent. alumina, 68.40 per cent. silica and 7.02 per cent. lime.

Copper Production and Stocks.

The official statement for January of the Copper Producers' Association, issued February 10, shows a reduction in the stock of marketable copper in the United States of 43,302,772 lb., as compared with the stock on hand January 1. The reduction is far greater than had been expected. The full statement is as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States, January 1	141,766,111
Production of marketable copper in the United States from all domestic and foreign sources during January 1-31	116,547,287
Deliveries of marketable copper during January 1-31:	
For domestic consumption	78,158,387
For export	81,691,672
Total	159,850,059
Stock of marketable copper of all kinds on hand at all points in the United States February 1	98,463,339

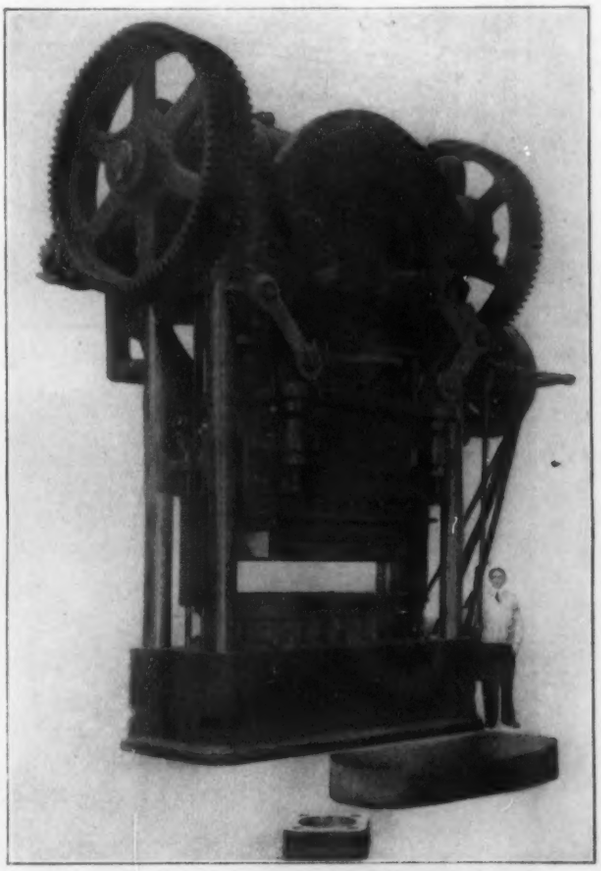
This is the most encouraging statement that has been issued since the publication of such statistics was inaugurated.

Correction.—In the illustrated description of the new Almond geared chuck printed in *The Iron Age* January 27, 1910, it was stated that the operating pinion used with this chuck might also be used with an earlier pattern described in these columns November 12, 1908. This was an error, and the statement should have been that the pinion may be used with either of the two sizes of the new chuck now manufactured.

A Large Ferracute Toggle Drawing Press.

What is believed to be the largest toggle double action drawing press ever built has been recently constructed by the Ferracute Machine Company, Bridgeton, N. J., from the designs of Oberlin Smith, its president and engineer, for forming the largest size of seamless burial caskets from 1-16-in. sheet steel. The press is equally well adapted for the forming of other large sheet metal shells, such as automobile bodies, bathtubs and metallic boats.

The whole construction of the machine is very massive and the bed is an 18-ton casting reinforced by internal ribs and trusses. The width between the columns is 9 ft. 4 in. and the extreme depth 4 ft. 6 in. Round steel columns 10 in. in diameter project upward from the corners and support the upper framework. These columns serve as slide bearings for the outer



A Mammoth Toggle Double Action Drawing Press Built by the Ferracute Machine Company, Bridgeton, N. J.

ram and take the tensile stresses. Heavy stays connect these columns at the top, and the crank shaft, which is forged steel, 15 in. in diameter and weighing 5 tons, is journaled in the end stays. At the ends of the shaft are keyed twin cast steel cut gears 7 ft. 2 in. in diameter and 18 in. face, weighing about 4¼ tons each. Instead of driving the back shaft in the usual way through gears at the end power is applied at the middle and it is claimed that in this way the torsional strains are balanced and the pressures at the ends of the shaft are equalized.

The lower toggles are connected to the outer ram or blank holder, while the upper ones are pivoted to the front and back stays. Pressure is applied to the outer ram at four points through four sets of these toggles. The crank shaft is connected to the plunger or inner ram by a pitman strap and pitman in the usual way, and there are two bearing points in the plunger. As the plunger descends rollers mounted on projecting studs bear against the upper toggles, straighten them out and force the outer ram down. When a stroke has been completed and the plunger

rises similar rollers on the other side of the toggles strike the projections at the knee joints. The toggles are thus made to resume their angular position and the outer ram is lifted by steel springs as soon as the toggles are tripped.

The ram has a stroke of 16 in., making it possible to draw work of very nearly that depth, and the plunger has a stroke of double that length. Both are provided with an adjustment of 8 in. The flywheel is 50 in. in diameter by 12 in. face. The press is driven by a 125-hp. motor, through a powerful friction clutch that enables the operator to stop and start the machine at any part of the stroke. A reducing gear having a ratio of 1 to 300 is used, so that the press makes about one and a half strokes per minute. This speed, it is stated, gives the machine a great advantage over the hydraulic presses usually employed for this class of work. Rods running up through the bed connect a positive knockout to the ram.

The principal dimensions of the press are as follows:

Total hight, feet and inches		20 2
Floor space, feet and inches	18	9 x 9 3
Width of bed, feet and inches		9 4
Depth of bed, feet and inches		4 6
Diameter of crank, inches		15
Stroke of plunger, inches		32
Stroke of ram, inches		16
Weight, tons		100
Ram pressure, tons		1500

One of the dies used in the press is shown on the floor in front of the machine, as well as the shell of a metallic casket after the first operation has been performed. This casket when finished will be 74 in. long, 21½ in. wide and 12 in. deep, and the lid, which will also be made by this press, will be the same length and width, but 4 in. deep.

Bailey Combination Sheet and Pair Furnace.

The original sheet and pair furnace for sheet mills required two separate fire boxes, each furnace operating independently and having a common stack. The combination furnace introduced more recently consists of a sheet and pair furnace heated by one firebox. The gases given off by the pair furnace pass into the sheet furnace, thence to the draft flues, dispensing with one firebox. It is estimated that under good conditions the use of the waste heat from the pair furnace for the sheet furnace represents a fuel saving of 40 per cent. The combination furnace shown in the illustrations, Figs. 1 to 7, was developed by the late W. H. Bailey. In brief, it is a tandem arrangement of stoker-equipped firebox and pair heating and sheet furnace.

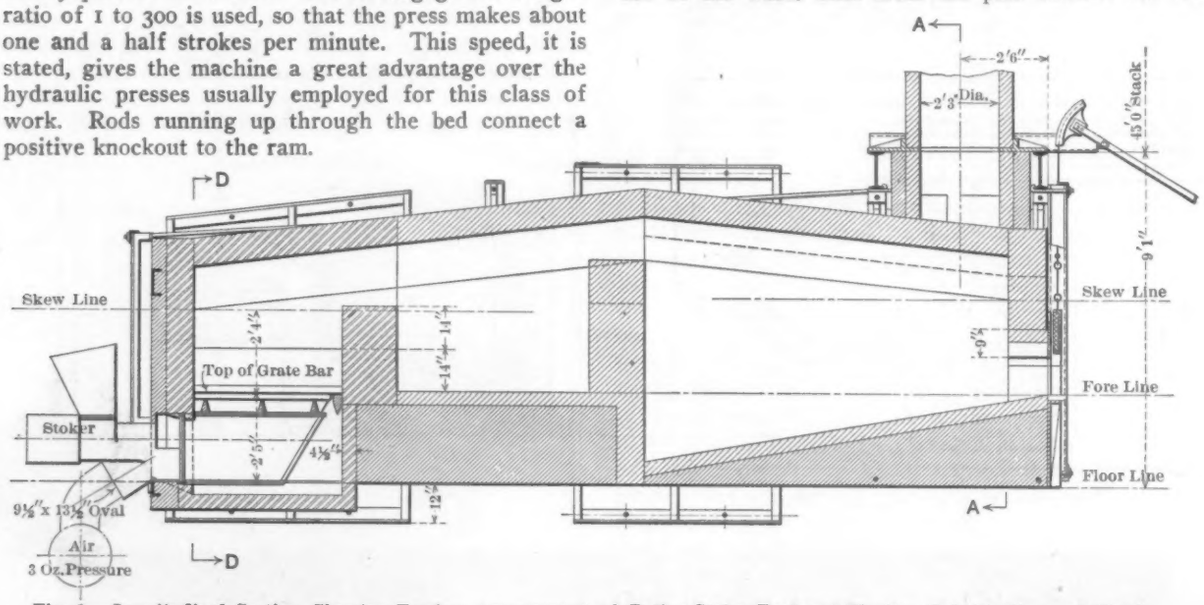


Fig. 1.—Longitudinal Section, Showing Tandem Arrangement of Bailey Stoker-Equipped Firebox, Pair Heating and Sheet Furnace.

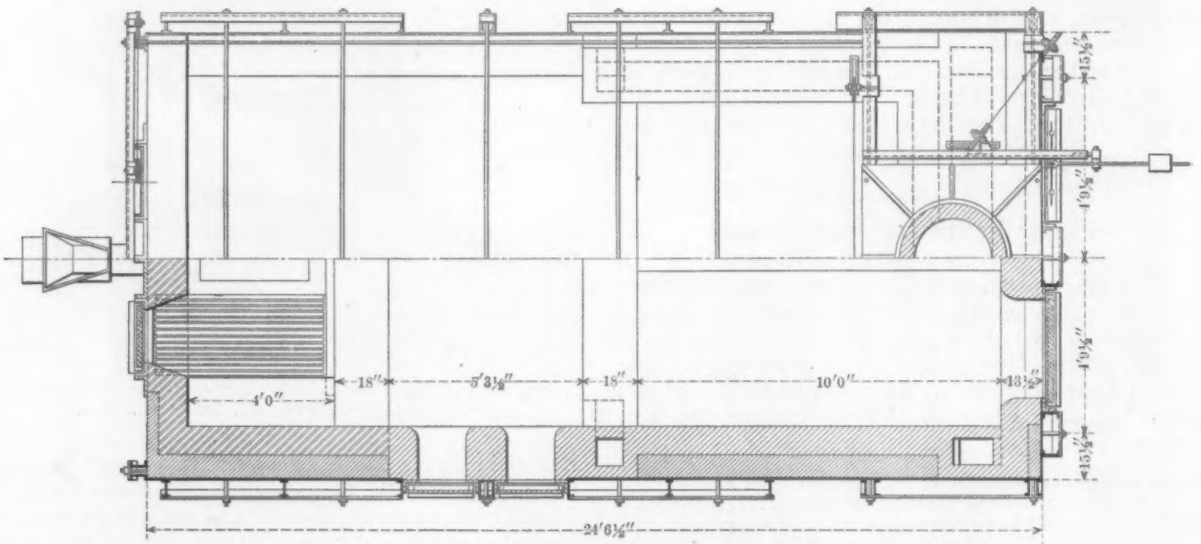


Fig. 2.—Plan of Bailey Combination Furnace.

Mr. Bailey's original combination furnace was designed for hand firing. It was adopted for a number of plants because of the considerable and to some persons unexpected saving in fuel it effected. A number of the original furnaces are still in use; but the lack of proper temperature control in hand firing was recognized and offset somewhat by the advantage of fuel saving. The stoker attachment more recently adopted gives uniform temperature through uniform feeding of fuel. The hot gases leave the fuel bed and pass over the first bridge wall into the pair heating compartment.

The high temperature of the gases in the first stage of their passage through the furnace is thus employed to the best advantage, as the heat in the pair furnace is naturally required to be higher than that in the sheet furnace. The stoker gives to the fuel bed a constant and uniform feed, making unnecessary the poking of the fire or the opening of fire doors. Thus an unusually clean furnace is insured. The desired temperature is obtained by the regulation of the automatic coal feed of the stoker and the adjustment of the air regulators. Independent control of the temperature of the sheet furnace is secured by by-passing the surplus off gases from the pair furnace direct to the stack by means of flues at the end of the pair furnace.

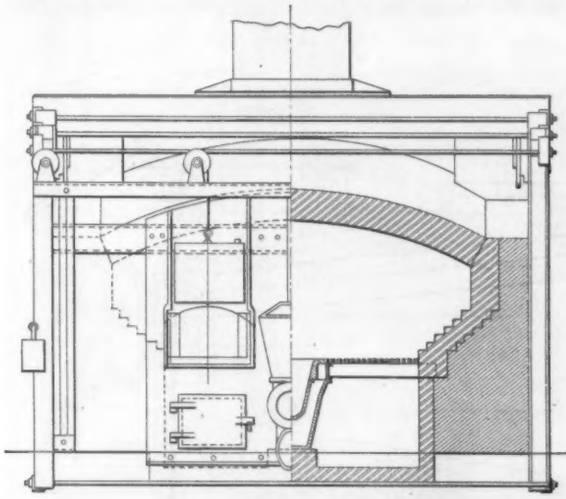


Fig. 3.—Half Section D-D, Fig. 1.

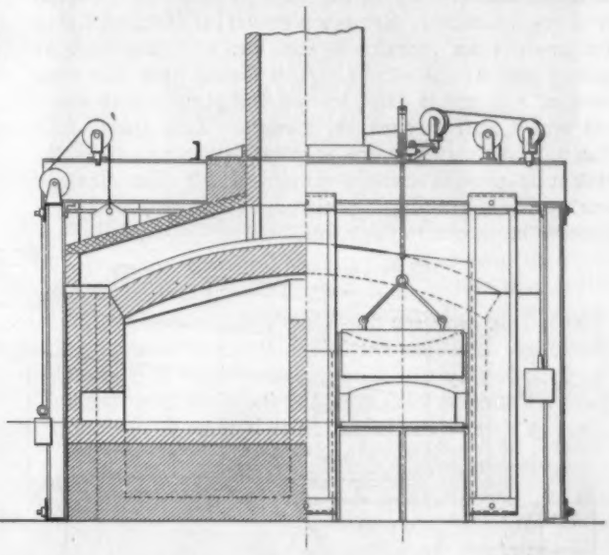


Fig. 4.—Half Section A-A, Fig. 1.

Fig. 5.—Installation of Bailey Combination Sheet and Pair Furnace at the Plant of the Thomas Steel Company, Niles, Ohio.

The capacity of the combination furnace shown is about a ton of sheets, for which the fuel consumption is given as 350 to 450 lb. of nut or slack coal of fair quality. This is compared with 600 to 800 lb. of an equal quality of fuel to a ton of sheets with the old style sheet and pair furnace with two fireboxes. It is possible to use oil, natural gas, or producer gas in the combination furnace, but the best fuel is coal, slack or nut giving satisfactory results as compared with lump or run of mine coal in hand fired furnaces.

In addition to the saving in fuel and floor space, the claim is made that with complete control of the furnace heat the operator is able to work the furnace to its maximum capacity, thus increasing output without detriment to the quality of the product. A point is made also of the elimination of scaling of pairs and sheets by preventing the liberation of free oxygen in the furnace.

The American automatic underfeed stoker attachment is the one employed with the Bailey furnace. It consists of a special screw conveyor, mechanically driven, which conveys the coal from an outside hopper into a magazine or retort inside. The incoming coal forces the coal in the retort upward into the fire, over tuyeres of air blocks which introduce the air where the

coal bed is thickest. The tuyere blocks alone come in contact with the fire; these are protected by the constant circulation of air and can be readily replaced.

George J. Hagan, 401 People's Bank Building,

Fig. 6.—Section of Firebox.

Pittsburgh, licensee for the Bailey combination furnace, has introduced it in a number of plants. It will be installed by the Youngstown Sheet & Tube Company, Youngstown, Ohio, for its eight new hot mills. Among sheet mills in which it is now in use, most of

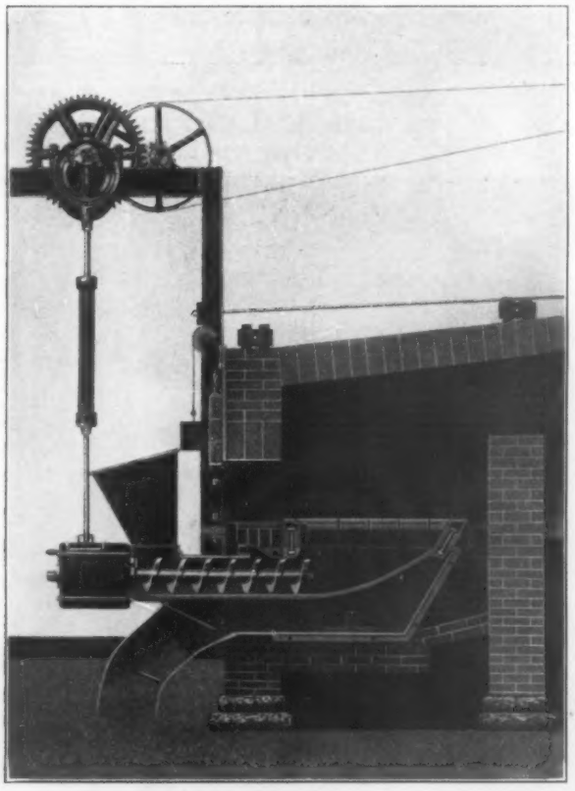


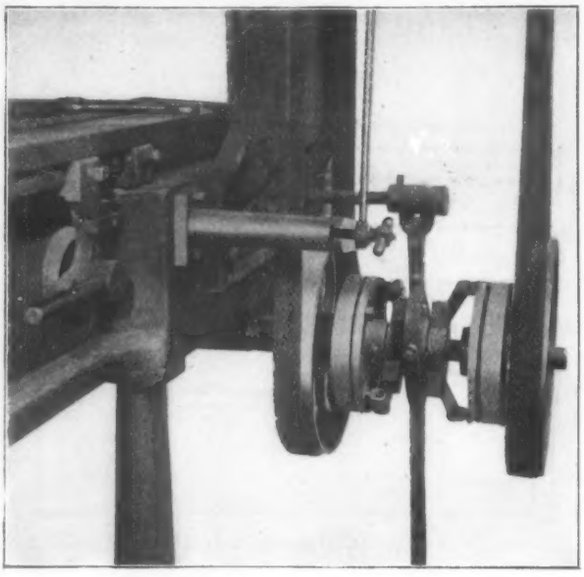
Fig. 7.—Stoker-Equipped Firebox.

them having a number of furnaces of this type, are those at Piqua, Canton, Martin's Ferry, Steubenville, Niles, Zanesville and Mansfield, Ohio, and Wheeling, W. Va. The patents on the furnace are protected by the Industrial Surety Company, New York.

The Canadian Sheet Steel Corporation.—E. R. C. Clarkson & Sons, Toronto, Canada, state that while the Canadian Sheet Steel Corporation, Morrisburg, Canada, has assigned, its business is being carried on more actively than before the assignment. It is expected that some form of reorganization will take place which will put the company in a stronger position than it was in prior to the assignment. This statement is made so that the creditors of the company may not be injured by the impression going abroad that the plant is shut down to the detriment of its business.

A New Clutch Planer Drive.

The clutch drive for metal planers shown in the illustration is designed by its builder, the American Twist Drill Company, Laconia, N. H., for operating the platen without the shifting of belts. The details are clearly shown in the illustration. The shifting mechanism, operated by the table dogs, controls the direction of the feed, for the cut or the quick reverse, the action being very positive. A principal advantage



An Improved Planer Clutch Drive Designed by the American Twist Drill Company, Laconia, N. H.

is that it requires very much less power to operate the clutches than to pull the belts across the pulleys, and in addition wear of the belts is greatly decreased. With this reversing mechanism the platen of the planer stops close to the same point at each end of the stroke, nearly as exactly as the ram of a shaper. It is designed for application to standard planers.

The Coates Chipping Hammer.

The electrically driven chipping hammer illustrated is designed to strike a blow equal to that of a pneumatic hammer, but with the substitution of an electric motor and flexible shaft for air as the source of power. It is built by the Coates Clipper Mfg. Com-

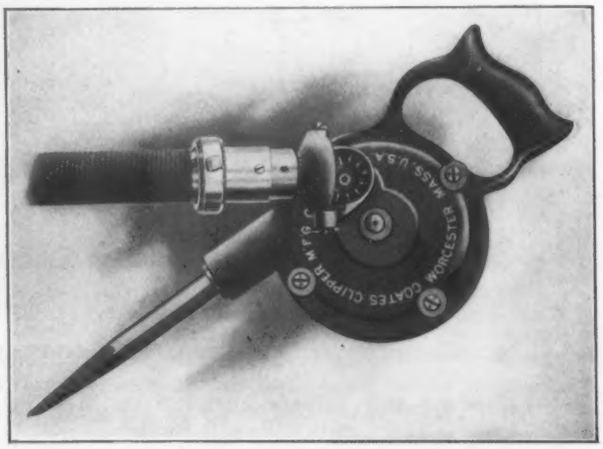


Fig. 1.—A Chipping Hammer with Flexible Shaft Drive Made by the Coates Clipper Mfg. Company, Worcester, Mass.

pany, Worcester, Mass., and is the latest addition to the already numerous tools and devices made by this company, in which its flexible shaft is employed to transmit the drive. One end of the shaft is connected

to a ½-hp. motor, while at the other end is a mongrel gear, which operates the hammer mechanism proper, the details of which have not yet been made public.

Fig. 2.—Steel Chips Cut with the Coates Hammer.

Nearly 2000 blows a minute are obtained, with results seen in the piece of steel, Fig. 2. The tool is designed for all classes of chipping work.

The Anderson Double Cushioned Triple Acting Valve.

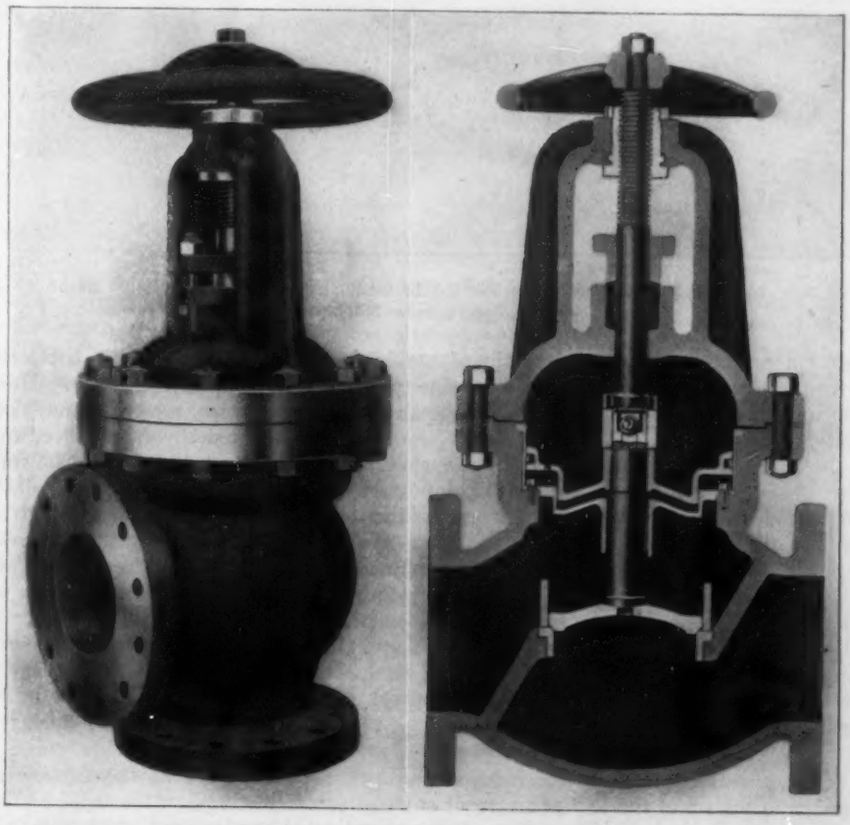
A valve which possesses an important emergency feature in addition to the ordinary functions of an efficient nonreturn valve, and works both ways to protect the entire system of boilers and steam piping against the otherwise disastrous effect of an accident in any part of a power plant, is the Anderson double cushioned triple acting valve, made by the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa. As a nonreturn valve it is similar in construction and identical in operation with the ordinary type, and for this service both models are alike and equally effective, having the double cushion feature, which permits quick closure without hammering or chattering. The nonreturn feature, however, only prevents backward flow of steam from the header into the boiler.

In the triple acting valve, described in *The Iron Age* July 8, 1909, there is an added emergency feature which causes it to act and prevent an outward rush of steam in case a break in the header or any part of the piping system permits a sudden escape of steam in excess of any legitimate power demand. Consequently in a battery equipped with these valves the flow of steam from every boiler is instantly checked should any accident happen to the header or main pipe, such as the bursting of a pipe or the blowing out of a fitting or valve. This emergency action is controlled by a pilot valve of the type illustrated and described in *The Iron Age* February 10, 1910.

It will be noticed from the sectional view of this valve that the stem has a central port closed by a ball valve at the top. Full boiler pressure is admitted to the entire space above the liner through this port and a small hole in the dash pot piston and is also carried by piping from the space between the two dash pots to the pilot valve. As the exhaust passes through the pilot valve its passage is checked by a small piston valve covering the exhaust port and held closed by an adjustable spring which is compressed by the forcing down of the pilot valve diaphragm, which receives the full header pressure on its upper surface.

If a break occurs in the header the pressure above the diaphragm in the pilot valve is reduced, thus permitting the spring to open the exhaust port. As this valve opens the boiler pressure from the cushion chamber of each triple acting valve has a free passage to the exhaust opening in the pilot valve and the steam escapes from the triple acting valve through this opening faster than it can flow in through the small hole in the piston. Thus the pressure in the triple acting valve is reduced and the boiler pressure above the dash pot piston, acting upon a greater area, forces the valve shut and holds it closed, thus preventing further flow of steam from the boiler.

In this closing action the double cushion feature operates exactly as in the simple nonreturn service. There is an instantaneous drop to within approximately ⅛ in. of the seat and then an easy closing under the control of the secondary dash pot. When it is desired to close the valve permanently the hand wheel is used to run the stem down on the top of the valve stem and make a steam tight joint.



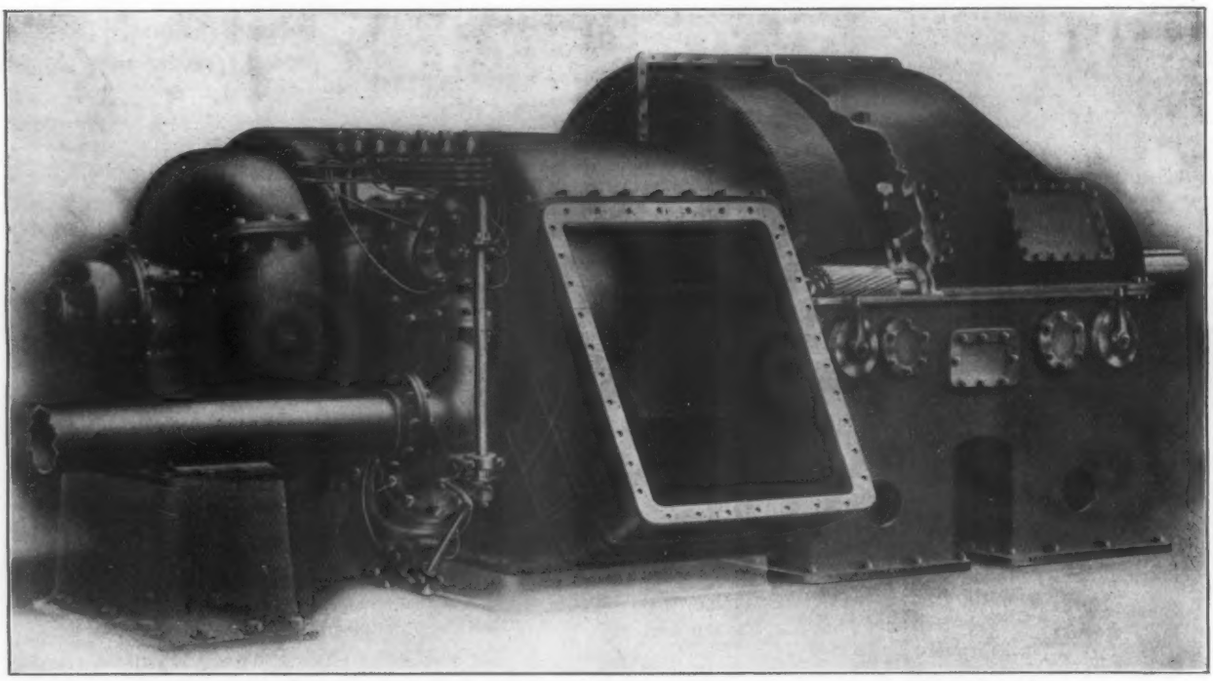
Exterior and Sectional Views of the Anderson Double-Cushioned Triple-Acting Valve Made by the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa.

Philadelphia Foundry Foremen.—The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and vicinity was held at its headquarters in Odd Fellows' Temple, Philadelphia, Pa., on the evening of February 8, with President C. R. Brown in the chair. After transacting current business the president announced the following Entertainment Committee to serve during the ensuing year: A. J. Wallace, W. P. Cunningham, George W. Benkert, James Whitehead and C. R. Brown, *ex-officio*. Nine new applications for membership were received. George W. Moore of the J. W. Paxson Company made a brief address on the subject of a new match board which will be further discussed at a coming meeting. After adjournment the members repaired to the Columbia Hotel, where a luncheon was served.

The Westinghouse Marine Steam Turbine.

It is generally admitted that the marine reciprocating steam engine is far from ideal on account of the large amount of coal consumed, its complicated construction, the amount of space occupied that might be utilized for additional cargo, and the unpleasant vibration. Marine engineers have worked for some years to produce a satisfactory substitute, and it was at first thought that the invention of the steam turbine had solved the problem, but on account of the high speed and the absence of any method of changing the direction of rotation, this prime mover, while possesing all the qualifications for land service, was not suitable for marine use.

The first objection may be overcome with the new Melville-Macalpine reducing gear, illustrated and described in *The Iron Age,* December 9, 1909, and to get rid of the second, George Westinghouse, president of the Westinghouse Machine Company, East Pittsburgh, Pa., in conjunction with its engineering staff, has designed a marine turbine particularly adaptable for use in connection with this gear for marine propulsion. The new turbine is shown in the accompanying illustration.



The New Westinghouse Marine Steam Turbine in Combination with the Melville-Macalpine Reducing Gear, Both Built by the Westinghouse Machine Company, East Pittsburgh, Pa.

In a brief printed description of the turbine recently issued, Mr. Westinghouse states that he has avoided the introduction of any untried or experimental features in the design, and while the machine as a whole is novel, it will be found upon analysis to be made up of elements that have proved their practicability and reliability. The new features are not based upon theoretical considerations, but are purely mechanical features, having to do with the simplicity and adaptability, the accessibility and the method of control of the turbine.

Features of the Turbine.

Each turbine is a complete independent unit combining the high and the low pressure ahead and astern turbines in one casing. Thus there is no complicated tangle of piping, as a single pipe brings the steam to the turbine and a single direct exhaust connection to the condenser suffices for both the ahead and astern turbines, as the exhausts from both sections communicate with each other through the hollow rotor. The comparatively high rotative speed reduces the number of rows of blades necessary to utilize the energy of the steam efficiently, and this number is still further decreased by making the first and largest pressure drop through a single impulse wheel instead of through a number of blades of the reaction type. For installation on board ship the compactness resulting from the use of the impulse wheel is a desirable feature. The distance between bearings is short with this type of construction, and the rotor is consequently stiff and has no tendency to set up vibrations. Another advantage claimed for the use of the impulse wheel for earlier stages of the expansion is that steam at high temperature is confined to the nozzle chambers, so that the range of temperature and pressure to which the turbine casing is exposed is greatly reduced with consequently less tendency to distortion.

The same size of impulse elements is provided for both the ahead and astern turbines, but the reaction blading used to complete the expansion of the steam is less in the latter. However, the power available for going astern is unusually liberal, it is stated, and the economy is sacrificed in a much smaller degree than is customary in marine turbine installations. Another advantage that it is claimed is not ordinarily encountered in existing marine turbine installations is that all the propellers are thus available for going astern. Two sets of concentrically arranged blade passages are provided for the impulse wheels, the outer annulus being considerably narrower than the inner one. If the turbine is working at low power, one or two nozzles may be opened which discharge on the outer or smaller blade ring; if more power is desired one or more larger nozzles may be opened to discharge against the inner or larger blade ring; and to develop the maximum power of the turbine all the nozzles and both blade rings are brought into action. The nozzles are so proportioned and are capable of operation in so many different combinations that the whole power range may be covered in convenient steps without throttling the pressure in the nozzle chamber. Thus the full expansive energy of the steam is available even though the vessel is running at the most moderate cruising speed.

Some of the Advantages.

Space on shipboard is so valuable that the engine room must be confined within the smallest possible limits, and it is important that the machinery should be so designed as to be readily accessible for inspection and repairs. The design of the Westinghouse turbine is therefore very novel in that all the pipe connections are made to the lower half of the casing and the covering may be removed without breaking a single pipe joint. In practically all the turbines hitherto designed, to gain access to the blades of the lower half of the cylinder necessitated the removal of the rotor, a task that was at best laborious and tedious and fraught with considerable risk of damage to the blading, and on shipboard the difficulties are multiplied. In this turbine the blades are mounted on flexible bronze strips instead of being caulked into grooves on the surface of the cylinder. These grooves are much wider and deeper than usual and are undercut slightly, leaving a shoulder overhanging near the top. The blade strips slip into the grooves where they cut through into the cylinder flanges and are held in place against the shoulders by the pressure of springs underneath. Thus the blading can be removed and replaced without unseating the rotor, and as an entire set of blading can be stowed in a very small space, repairs can, if necessary, be made by the engineering staff at sea quickly.

Details of Construction.

The bases of the blading strips are extended on one side, so that they project over the tips of the corresponding rows of rotor blades and thus form a removable bronze lining for the cast iron cylinder. On account of the spring backing of the blade strips the clearance between the blade tips and the cylinder or rotor can be reduced to a minimum that would be impossible with rigidly inserted blading. It has been found practicable to assemble the turbine in the shops with the blade tips in contact with base strips and the rotor and allow the clearance to adjust itself by actual wear. This is of course the ideal method of getting the smallest possible clearance and reducing the leakage past the blade tips to the lowest limit. An actual trial in a turbine having a capacity of over 20,000 hp. has demonstrated the practicability of this blading. This turbine was operated for the first time in April, 1908, and in September of the following year after 17 months' continuous service, an inspection of the blading showed it to be in perfect condition.

The Local Control.

There are two independent throttle valves on each unit, one for the ahead turbine and the other for the astern turbine. These are operated by simple levers, and are so designed that a continuous movement of either operating lever from the closed position opens successively all of the different combinations of nozzles and admits steam in constantly increasing quantities until the maximum power is obtained. The design of this valve is such that two small ports placed close to each other in one transverse plane communicate with a hollow valve casing, and there are two larger ports side by side in an adjacent parallel plane. Inside this casing is a rotatable hollow sleeve or valve, with openings cut in it to register with the openings in the valve casing when the valve is moved to the proper position. There are two openings in the plane of the smaller ports, and each is wide enough to uncover both of the smaller ports at the same time, and between is a bridge that is wide enough to cover both of the smaller ports. There is an opening in the valve on the same plane as the two larger ports that is considerably wider than the combined width of these ports.

If all the ports are closed and the hollow valve is rotated in one direction, one of the smaller openings will uncover one of the small ports, and a further movement of the valve will uncover both. When both the smaller ports are uncovered the large opening in the other plane begins to uncover one of the larger ports, so that in the next position of the valve there is one large and one small port open. Moving the valve still further uncovers the other large port and closes both the small ones, and if the movement is continued one and both of the smaller ports are successively uncovered by the second opening in the plane of the smaller ports. As the opening controlling the larger ports is much wider than the combined width of these two, they also remain open. Thus with four ports, six combinations are possible, and by making suitable index marks on the gear it is easily possible to adjust the valve to give any desired combination of nozzles.

Distant Control.

While the turbine may be manually controlled by the engineer in accordance with instructions transmitted by the ordinary ship telegraph, it is possible to control it directly from the bridge or from any one of several different points by an electro-pneumatic operating gear working on the throttle valve levers. This is of advantage in cases of emergency where the small amount of time saved by causing the signal to the engineer to actually perform the desired operation would be well worth saving. Another case is where the steering gear becomes disabled and steering with the screws would be particularly convenient and efficient with the speed and direction of the engines under control from the bridge. This system of electro-pneumatic control has been thoroughly developed and standardized for operating railroad signals, and its application to the control of turbines presents no new problems. Another feature of this system is that the instant the desired operation has been performed the fact is automatically signaled back to the operator.

For operating the throttle valve from any point at a considerable distance from the engine, a motor actuated by compressed air is attached to the valve stem and the admission and exhaust of the air is controlled by small valves opened and closed by electro-magnets. In the cover of the valve body there is a short cylindrical chamber through whose center the valve stem passes. A sector shaped abutment fitting tightly against the top, bottom and side of the cylinder and having a packing strip bearing against the valve stem is located in one side of this cylinder. A sort of wing piston is attached to the valve stem and is free to move in that portion of the cylinder not occupied by the abutment. If openings are provided in the circumference of the cylinder close to either side of the stationary abutment, it is evident that by alternately admitting and exhausting air under pressure through these openings the wing piston will swing between the limits imposed by the walls of the abutment and thus move the valve from one limit to the other of its travel. It is necessary that the piston should stop in any one of several intermediate positions, and this is secured by making openings at different points on the cylinder circumference between the two limiting positions, each of which is connected to a separate valve. Thus, if the valves are all closed and air is admitted behind the piston, it will travel to the other end of its stroke, but if any of them are opened the air will escape through the port connected to that valve and the piston will stop immediately after passing that opening, as there is no longer any pressure to force it along.

Peat for Railroad Use.—Experiments have been made by Swedish railroads on the Southern line with peat as fuel for making steam; but, according to *Power and The Engineer*, the results have not been satisfactory when peat was used alone with the present type of locomotives. Valuable experience has, however, been gained as to how locomotives for peat burning should be constructed, and the railroad authorities are about to recommend the construction of some locomotives especially designed for the use of peat instead of coal.

The Pressed Steel Car Company.

The eleventh annual report of the Pressed Steel Car Company shows that profits for the year ending December 31, 1909, including the sale of its Canada Car Company stock, were $1,954,582.67. The surplus December 31, after the deduction of $120,000 for depreciation and renewals and the payments of dividends on preferred stock, was $6,653,639.68, beside which $778,059.74 was held as a reserve for contingencies. The condensed balance sheet, as of December 31, makes the following comparison with that of the previous year:

	1908.	1909.
Assets.		
Properties and franchises	$26,929,531.47	$27,054,968.03
Securities	2,504,383.62	1,951,740.32
Taxes and insurance, not accrued.	37,218.84	23,546.29
Current assets:		
Accounts receivable	660,104.61	2,157,670.73
Inventory	246,509.58	2,842,074.79
Cash	2,837,989.80	987,359.59
Totals	$33,223,737.92	$35,017,359.75
Liabilities.		
Common stock	$12,500,000.00	$12,500,000.00
Preferred stock	12,500,000.00	12,500,000.00
First mortgage gold notes	1,000,000.00	500,000.00
Purchase money mortgage — McKees Rocks	235,000.00	.....
Purchase money mortgage—Allegheny	75,000.00	75,000.00
Current liabilities:		
Accounts payable	169,532.01	1,689,361.17
Accrued salary and wages	37,001.40	141,925.64
Accrued interest	21,017.55	10,623.52
Accrued preferred dividends	218,750.00	218,750.00
Surplus	5,694,057.01	6,653,639.68
Reserve for contingencies	773,379.95	778,059.74
Totals	$33,223,737.92	$35,017,359.75

From the accompanying statement by President F. N. Hoffstot the following extracts are taken:

The gross sales of the company for the fiscal year ending December 31, 1909, were $10,346,816.19. About 75 per cent. of this business was done during the second and fourth quarters of the year, for the reason that during the first quarter, after the depression of 1908, the works were not in full operation, and the output for the third quarter was small owing to labor difficulties at the McKees Rocks works, which began July 13 and continued about about 60 days, causing a very limited operation.

The company at the present time has a substantial amount of business booked, on which it expects to make a reasonable profit, and as there appears an earnest desire on the part of most manufacturers of raw materials used by the company to maintain reasonable prices it is thought this attitude of producers of raw material will stimulate a continuous demand for the product, and it is believed car buying will continue in a regular and uniform manner during 1910, and if it does the company should receive its full share of the business. The buying of cars during 1909 was considerably below the average yearly requirements for the last 10 years, without taking into consideration either the increased mileage or population.

The 10-year purchase money mortgage amounting to $235,000 on the McKees Rocks plant matured in July and was paid and the ninth installment, due February 1, 1910, was anticipated and paid in August last, leaving only $500,000, due February 1, 1911, of the original issue of $5,000,000 notes.

During the year $245,436.56 was expended on improvements and betterments, a large amount of which sum was used for the completion of the installation of a turbine exhaust system at McKees Rocks and certain improvements in methods for constructing cars that will reduce the amount and quality of manual labor. In the above amount is also included the cost of installing a water supply system at the Allegheny works similar to that installed a few years ago at the McKees Rocks works. Water was heretofore supplied this works by the city water works, but such an increase in price was demanded that it was deemed advisable in the interest of economy for the company to provide facilities for pumping its own water. The physical condition of the plants was never in a higher state of efficiency than at the present time. Almost as much has been charged to expense account to cover replacement and repair to the different buildings and appliances as has been charged to improvements and betterments.

Labor Difficulties.

On July 13 certain employees misunderstanding rules and regulations quit work and undertook to prevent those who wished to continue work from so doing. The dispute between these two factions, the one quitting work and the other desiring to continue work, caused such a disturbance that it was necessary for the management to ask for the protection of the authorities of Allegheny County. The disturbance was seized on by various labor leaders as a favorable opportunity to attempt to organize the company's employees into labor organizations and to make rules to govern and determine the rates of wages that the company should pay. This was attempted notwithstanding the fact that the company's business is almost entirely a piece work proposition and one that is not and cannot be measured by a daily rate of wages, the wages paid for labor being dependent entirely upon the character of the work, the ability and efficiency of the employee and the price the company is able to secure for its product.

By reason of this attempted organization of the former employees and by reason of other outside interference, which tended to prevent their resuming work, it required about 60 days from the time that these labor troubles began for the men to appreciate that the management had given and would continue to give all employees just treatment and fair and reasonable wages. On September 9 the troubles ceased and the company's shops were immediately filled by men anxious to work at the same rates of wages and under the same methods prevailing at the time the disturbance began. Since then, and as heretofore, wherever men have been found efficient they have received voluntarily and gladly proper recognition in proper wage advances, it being the endeavor on the part of the management to give the men their full share of any substantial profit derived from their more efficient service.

It seems unnecessary to go into further details on this subject other than to state that, recognizing the fact that the company must necessarily employ a large number of foreigners (over 70 per cent.), new to American ways and unfamiliar with the English language, a special department was installed when this disturbance began at McKees Rocks and another has since been opened at the Allegheny works, known as "Information Bureau and Interpreter's Office." These bureaus are under carefully selected heads, with proper assistant interpreters, who hear and investigate every complaint or grievance brought to their attention. The operation of this department has been satisfactory to the men and most gratifying to the management, and has removed many cases of misunderstanding among the men and to a large extent during the labor difficulties enabled the company to inform and convince the men that no real differences existed, but that they were being misled and misinformed by their leaders and others seeking notoriety and personal benefit. It is believed that this bureau affording a place of explanation for the employees will tend to prevent misunderstandings in the future and lessen the effect of outside interference.

The direct cost occasioned through the compulsory shutdown of the works over the above mentioned period and the extra cost occasioned by these labor troubles have been charged to contingent fund, which

fund during the year increased sufficiently to more than absorb this charge.

The executive committee of the company carefully considered at the time and the board unanimously approved the policy adopted by the management in the conduct of these labor troubles.

Canada Car Company, Ltd.

During the summer two important car manufacturing concerns in Canada were acquired by Canadian capitalists, who urged that the Canada Car Company, Ltd., be merged with them. After many conferences, and upon the urgent request of a majority of the minority holders of both the common and preference shares, the management named a price for the company's holdings and sold its shares in the Canada Car Company, Ltd., to the Canadian capitalists. The preference shares appear in the annual reports under the heading "Stocks and Securities Owned," but the common stock, referred to in former reports, has heretofore had no value placed upon it on the company's books. All the money the company had invested in the Canada Car Company, Ltd., together with interest at 7 per cent., was realized and in addition an amount aggregating $1,700,000 was received for the common stock and new contracts covering patents and new business relations entered into between the purchasers and this company. All the consideration was paid in cash with the exception of $500,000 in notes, which mature in yearly installments of $100,000, over a period of five years.

Pennsylvania Car Wheel Company, Ltd.

This plant did not operate during the year, and as the lease of the ground on which it stands expires next year we contemplate disposing of the buildings and improvements, as the introduction of the rolled steel wheel has materially reduced the demand for cast iron wheels under cars such as we build. We believe the Central Car Wheel Works, which is owned by the Pennsylvania Malleable Company, a constituent company, will be able to furnish nearly all the cast iron wheels this company will use, and that the full operation of one plant will be able to produce wheels at a lower cost than the operation with a reduced output of two plants.

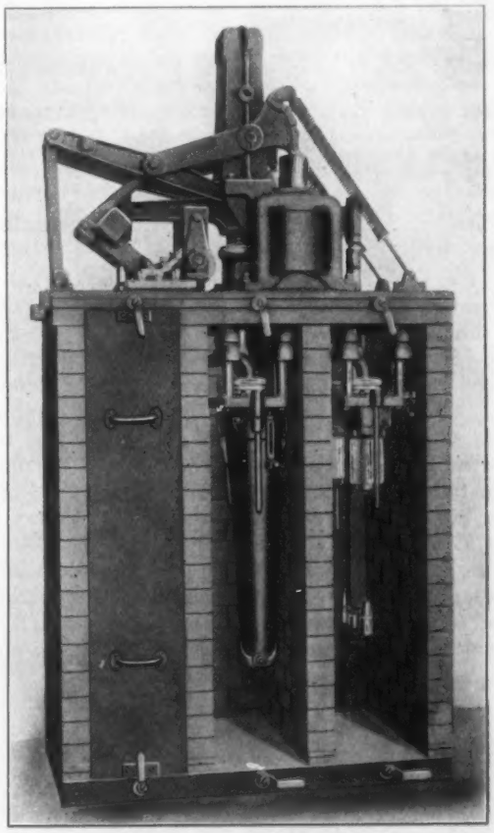
As this company owned 86⅓ per cent. of the stock of the Pennsylvania Malleable Company and its business from sources other than the Pressed Steel Car Company was not substantially remunerative, and yet required the maintenance of separate heat, light and power plants, and owing to its proximity to the company's McKees Rocks works, the unifying of these plants with this company's power plant would result in a large saving therefrom, the management decided to present to the stockholders of the Pennsylvania Malleable Company a proposition to lease their plant at a fixed annual rental. An offer was therefore made by the Pennsylvania Car Wheel Company to lease at a fixed annual rental for a period of 25 years the entire property, which proposition after careful consideration was accepted by the shareholders of the Pennsylvania Malleable Company.

Westinghouse Oil Circuit Breakers With No-Voltage Release.

To meet a special set of conditions existing in the new merchant mills of the Indiana Steel Company, at Gary, Ind., the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has equipped its standard type C circuit breakers with a no-voltage release device that opens the gravity operated contacts instantly if the line voltage is interrupted to control eight large 6600-volt Westinghouse type HF three-phase induction motors, varying in capacity from 650 to 3200 hp., which drive the rolls.

In the ordinary type C circuit breaker the contacts are held closed by carrying one of the toggle joint members of the standard switch gear over the dead center where it locks, but in this new model the toggle is fitted with an armature which engages and is held by the attraction of the pole pieces of the no-voltage coil for its armature just before it passes its central position as will be noticed from the accompanying illustration.

Thus if any interruption to the supply voltage occurs, the circuit breaker immediately opens and cannot be closed except in the usual manner. In this way full protection is afforded to the motors connected through the apparatus, and if the rolls should be overloaded, or the power supply fail, the circuits are immediately opened, so that the machines must be gradually accelerated in the usual way.



The Type C Oil Circuit Breaker with No-Voltage Release, Built by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

These circuit breakers are similar to the Westinghouse standard type C oil circuit breakers, with the exception of the no-voltage release, and include all the features of solenoid operation, oil submersion of contacts, simple lever switch gear, gravity opening, and minimum quantity of oil required, which are among the advantages of this type. The breaker is designed for mounting in a brick or concrete structure, separate cells inclosing the sheet metal switch tanks of each phase. An effective barrier between the pairs of contacts of each pole is interposed by the operating rod and the insulting lining of the tank. When the breaker is assembled no high tension parts or wiring are exposed and a double throw double pole switch operated by the controlling levers lights red or green lamps and serves as a telltale to show whether the contacts are open or closed.

Type C oil circuit breakers, equipped with no-voltage release, in addition to such special service as that described, will be found useful if inserted in the service mains of large power consumers. By opening the circuit promptly when so installed, they will relieve the heavy load conditions met by the power house in restoring service after an interruption.

The J. G. Brill Company.

The J. G. Brill Company, Philadelphia, Pa., reports that the output from the five plants owned and operated by that company for the year ended December 31, 1909, amounted to $4,261,204.90. For comparison the amounts of the combined sales of the five companies for the four years last past are given as follows: 1906, $6,908,346.22; 1907, $9,211,825.72; 1908, $3,845,173.91.

The combined balance sheet of the parent and subsidiary companies, as of December 31, 1909, is as follows:

Assets.

Cost of properties	$8,468,673.20
Materials, raw and in process	1,980,840.95
Bills and accounts receivable	1,319,479.45
Investments	90,431.08
Cash	193,092.36
Total	$12,052,517.04

Liabilities.

Preferred stock	$4,580,000.00
Common stock	5,000,000.00
Bonds (John Stephenson Company)	400,000.00
Bills and accounts payable	987,512.68
Surplus	1,085,004.36
Total	$12,052,517.04

The Brill plant earned a profit of $290,888.64, while the subsidiary companies lost $52,752.95. For depreciation $56,302.93 was set aside for the Brill plant and $51,048.71 was taken from the company's surplus for the other plants. Dividends amounting to $320,600 were paid during the year on the preferred stock. The surplus, which was $1,339,449.83 January 1, 1909, was reduced to $1,085,004.36 January 1, 1910. President James Rawle says: "The result of the operation of the Brill plant for the year 1909, in spite of an output far below normal, and in spite of the very low prices at which work necessarily had to be taken in the later part of 1908 and during most of 1909, showed a substantial profit. The net result of the operation of the subsidiary companies showed a loss. Of the four subsidiary companies, one, the Stephenson plant, was closed during almost the entire year; the others were operated at only a small part of their capacity. . . . As stated in my report of February 10, 1909, the general fixed overhead charges, such as insurance, depreciation and taxes, are practically unchangeable, and the necessity for keeping up an effective organization, always ready to obtain and execute work, made it impossible to decrease materially the overhead expenses during the year. It is obvious that in times of depression, when competition is increased, the selling expense is increased somewhat in proportion to the difficulties attending the obtaining of orders."

Canadian Notes.

TORONTO, February 12, 1910.—The following resolution was passed at a meeting of the Western Grain Growers' Association, held at Prince Albert, Saskatchewan, this week:

Whereas, Canadian machinery can be purchased at from 10 to 30 per cent. less in Great Britain than in the Canadian West, and whereas, we believe such conditions are caused by the protective tariff existing at the present time, therefore be it

Resolved, That immediate steps be taken regarding the said tariff so that the home purchaser may at least be able to purchase as cheaply as the outside world.

Speaking in the Canadian House of Commons a few days ago, the Minister of Railroads and Canals said that the new Quebec Bridge will cost $17,000,000.

Notice was given in the official *Gazette* last month that letters patent have been issued to constitute the Superior Rolling Mills Company, Ltd., with a capital stock of $500,000, the city of Fort William to be the chief place of business. The charter enables the company to mine, smelt, operate rolling mills for the making of wire, steel rails, muck bar, and, generally, to manufacture iron and steel, as well as to do many other things. C. A. C. J.

The Ingersoll-Rand Managers' Meeting.

The annual conference of managers and agents of the Ingersoll-Rand Company was held in New York and at the company's shops from February 1 to 5, inclusive. The meetings were presided over by President W. L. Saunders; other executives in attendance were as follows: George Doubleday, first vice-president; J. P. Grace, vice-president; Geo. R. Elder, vice-president; W. R. Grace, vice-president and treasurer; F. A. Brainerd, secretary; Henry Lang, director. The sales organization was headed by J. H. Jowett, general manager of sales, and the shops were represented by F. W. Parsons, manager of the Painted Post and Athens shops, and Wm. Prellwitz, chief engineer of the Easton and Phillipsburg works. The heads of departments from the home office in New York were also present, while the general sales force was represented by managers and agents from all the domestic offices and several of the foreign offices.

Leaving New York by private car on Tuesday morning, the party passed en route through the Musconetcong tunnel, the first railroad tunnel in America driven entirely by machine drills, the rock drills used in this work having been built by one of the pioneer companies now comprising the Ingersoll-Rand Company. The first day was spent at the Easton, Pa., plant, examining the line of compressors, stone channelers, hammer drills, core drills and pneumatic tools built in these shops. The second day was devoted to the Phillipsburg, N. J., works, inspecting the rock drills, electric air drills, coal cutters and large compressors which are the products of this plant. A special train conveyed the party to the Painted Post, N. Y., shops, where Thursday was given to an exhibit of the compressors, rock drills, hammer drills, pneumatic tools and pneumatic hoists produced at this plant and at the Athens, Pa., shops. Returning to New York by special train, Friday and Saturday were occupied by business meetings at Hotel Astor. The social features of the conference closed on Friday evening with a banquet and theatre party. The number in attendance varied between 40 and 50.

Among the foreign representatives present were: Conrad Bollinger, from the London office; F. A. Shoffel, Paris manager; Nicholas Romeo, Milan, Italy; Victor M. Braschi and Juan Cuyas, Mexico City, and E. W. Gilman of Montreal, vice-president, Canadian Rand Company, Ltd. The domestic offices, branches and agents were represented as follows: New York, L. D. Albin, M. P. Frutchey, W. H. Armstrong, R. S. Carter, G. A. Howells, L. I. Robling, C. F. Schwep, L. I. Wightman, L. E. Elmore, A. H. Hofmann, P. A. Raymond, H. T. Abrams, R. D. Purcell, W. R. Doremus, F. V. D. Longacre, F. W. Iredell, E. N. Sutliff, F. C. Lauer, F. L. Fairchild; Boston, Geo. H. Sampson, W. T. Page, E. Davis; Philadelphia, Philip Weiss; Birmingham, J. A. Yates; Pittsburgh, W. B. Brendlinger; Cleveland, Geo. R. Murray; Chicago, C. W. Melcher, M. W. Priseler; Duluth, Thos. Lynch; St. Louis, A. A. Bonsack; El Paso, H. M. Perry; Denver, Thos. Stearns; Salt Lake City, J. E. Galigher; Butte, Geo. T. Cousins; Wallace, J. H. Taylor; San Francisco, J. O. Harron.

The American Steam Gauge & Valve Mfg. Company, 208 to 220 Camden street, Boston, Mass., states that its business for January not alone greatly exceeded any previous January, but has proved to be the biggest month's business ever done during the 60 years it has been engaged in manufacturing power plant appliances. That this is a justification for all the preparations the company has been making, with the conviction that 1910 would be a banner year, is strikingly corroborated by the character of this January business, as it consisted entirely in normal orders from every section of the continent.

Thurston Memorial Dedication.

The dedication of the memorial tablet to Robert Henry Thurston at the Engineering Societies' Building, February 8, was an impressive occasion. Seldom has a man, however high his attainments as a leader in his profession, received such a tribute for his lovable personality. The addresses bore testimony to Dr. Thurston's genial and serene disposition and his interest in others, qualities often lacking in so unremitting a worker as was he. Dr. Alexander C. Humphreys, president of Stevens Institute of Technology, presided as chairman and spoke of his own acquaintance with Thurston from the time that he was a student under him until he himself was installed as president of Stevens Institute, with Thurston present at the ceremony. Prof. John E. Sweet, honorary member and past president of the American Society of Mechanical Engineers, who had been closely associated with Dr. Thurston in the organization of the society, gave a brief history of the latter and the circumstances which led to the election of Thurston as the first president. He referred also to the great interest taken in the society throughout the lifetime of its first president.

Courtesy of Power and The Engineer.

The Bronze Tablet to Robert Henry Thurston, First President of the American Society of Mechanical Engineers, Unveiled in the Society's Rooms February 8, 1910.

A communication from Benjamin Franklin Isherwood, Rear Admiral, United States Navy, retired, was next read by Prof. F. R. Hutton, dealing with Dr. Thurston's career as a naval engineer, particularly referring to his service during the Civil War. In the absence of Rear Admiral George W. Melville, United States Navy, retired, honorary member and past president of the American Society of Mechanical Engineers, a communication from him was read by the chairman, which dealt principally with Thurston's work while at the Naval Academy at Annapolis, and made further references to his life as a naval engineer. A tribute was also read from Robert Crawford along the same line and another was received from Charles H. Manning, chief engineer of the United States Navy, who has known the man honored since 1870.

Col. E. A. Stevens, son of the founder of Stevens Institute of Technology, gave an address dealing with the doctor's work, paying high testimony to his personal influence and dealing somewhat with the history of the founding of Stevens Institute. The research and literary work of Dr. Thurston was covered by Prof. William Kent, one of the organizers of the American Society of Mechanical Engineers and closely associated with Dr. Thurston, first as a student and later in connection with other work in which he was engaged under the direction of Professor Thurston. He spoke particularly of the tests of the triple alloys of copper, tin and zinc, the results of which gave such an important addition to our knowledge on this subject. The last speaker was Walter C. Kerr, one of the trustees of Cornell University and president of Westinghouse, Church, Kerr & Co. As an alumnus of Sibley College, Cornell University, and interested in its welfare, he was particularly well qualified to speak of the labors of Dr. Thurston in the development of Sibley College from the time when it had but 100 students until it had 1000, at the time of Thurston's death.

Following the addresses the assemblage adjourned to the eleventh floor of the Engineering Societies' Building to witness the unveiling of the memorial tablet. On behalf of the committee Dr. Humphreys presented the tablet, and it was accepted for the society by Col. E. D. Meier. Herman A. Mac Neil, the artist who designed the tablet, a former student and personal friend of Dr. Thurston, was introduced and made a few remarks on the significance of such a memorial.

Pittsburgh Manufacturers Discuss Advertising.—The Manufacturers' Publicity Association, composed of advertising representatives of manufacturing companies in the Pittsburgh District, held a dinner and open meeting in the Fort Pitt Hotel on the evening of February 11, to which a number of newspaper and trade paper representatives were invited. About 50 advertising men were present. The meeting was called to order by C. B. Nash, assistant advertising manager of the Standard Sanitary Mfg. Company, Pittsburgh, who is president of the association. He outlined the work which the association proposes to carry out, the primary objects of which are to put advertising on a scientific basis, eliminate waste, &c. He then introduced Robert Frothingham of New York, representing *Everybody's* and the Butterick trio, who read a paper on "The Indestructible Asset," which covered the manufacturers' product, its merit, method of selling and necessity of plenty of effective advertising to market it, in place of disposing of it through the natural demand, and, lastly, the good will of the consumer toward the manufacturer, making a meritorious article, which really represented this valuable asset. Other speakers were F. H. Ralston of the Butterick publications, who spoke on "Reaching the Dealer," and Colon Gordon of the H. J. Heinz Company. The Manufacturers' Publicity Association now has 24 members, who are responsible for the advertising issued by the largest manufacturers of electrical machinery, engines, mill equipment, sanitary ware, &c., and its prospects for growing and doing good seem bright.

The Wisconsin Engine Company, Corliss, Wis., is building a crank and flywheel pump for the water works for the city of Perth Amboy, N. J., having a capacity of 12,000,000 gal.

THE IRON AGE

Established in 1855.

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The High Price Inquiry Raises Old Questions.

The continued agitation concerning high prices of commodities and the continued attacking of the problem by would-be economists are producing about the same clarity of view that results from the discussions of political campaigns. All sorts of explanations for the present level of prices in the United States are being proffered. Along with reasons that have an obvious bearing on the question are others but remotely related to the price developments that admittedly have taken on first-class importance only in the past few years.

The resolution passed in the Senate at Washington last week provides that a Senate committee of seven shall investigate the increased prices for food, clothing and other commodities, and that special attention be given to farm prices of food products and the selling prices in large cities; also that a special subject of investigation be wages, salaries and earnings, and the question whether they have increased in proportion to the cost of living. Three general lines of influence are to be looked into: First, the increased production of gold and consequent expansion of currency; second, the tariff and other legislation; third, trade and industrial combinations. We are told that the inquiry will be conducted with dispatch, with the thought, one might infer, that the country is entitled to know at the earliest date what is troubling it, to the end that the remedy—more legislation, presumably—may be quickly applied.

While the tide of popular discontent had risen so high that a Congressional investigation was inevitable, there is no strong hope of legislative relief from such an inquiry. The maze of contradictory testimony brought out in the tariff hearings of 1908 and 1909 indicates well enough what will be developed by an inquisition into the complicated and widely ramifying issues now to be taken up. We can fancy the mental state of the committeemen as they learn from interest after interest that each has suffered from the conditions under which it has been compelled to do business in the past five years. As for agreeing on any legislative remedies, that will prove more hopeless even than agreeing upon the causes of continued high prices. What may be of value in the investigation is that it will give shape to public opinion, which at the last must be reckoned with in this country in all economic changes.

It is not surprising that the present discussion has brought out some arguments that have done duty in nearly every political campaign in the past generation What is more to the point is light on the problem of the increasing disproportion alleged to exist between wages and salaries and the cost of what the wage earner and salaried man must buy. If low prices are in themselves a desideratum, we have only to go back a dozen years for that condition and then seek to duplicate the causes then operative. When three pounds of steel in the billet could be bought in the United States for two cents, common labor at iron and steel works was receiving $1.10 a day. That is not the sort of scaling down that is wanted, either for steel prices or for wages. Some journals, in an assumed attempt to help solve the immediately pressing problem of high prices, have gone to discussing whether the United States is to continue to be a high standard country in returns for both capital and labor. Such discussion is of little use just now; the high standards of American living are not new, nor is the complaint that the benefits of the favorable conditions here are not evenly distributed. What was avowedly aimed at by the last national administration was to reduce the accretions to already swollen fortunes and to increase the net return to the citizen of small means. One step in that programme was the Presidential intervention to prevent a reduction of railroad wages when the returns of all industry were dwindling rapidly. The larger undertaking, which apparently aims to reduce the returns to industrial capital and at the same time increase the returns to labor, involves considerations that apply not solely to the United States—though we are sometimes asked to believe so—but to the present day industrial system the world over. What is meant by certain proposals recently brought forward in the press goes far deeper than any temporary readjustment of purchasing power. Under whatever disguise, it is a Socialistic programme. It is well to have that fact well understood, for changes so revolutionary as are sought in some quarters will not be brought about except at a cost which plainly has not been counted.

The Lake Superior Ore Movement of 1910.

The expectation of a 50,000,000-ton movement of Lake Superior ores in 1910 has been referred to in connection with the sales of such ores made in the past two months. Its basis appears to be the continuance of pig iron consumption at substantially the rate indicated by the absorption of that product in the past four months—or, say, 31,000,000 to 32,000,000 tons a year. A 50,000,000-ton movement, as against 42,500,000 tons, roundly, in 1909, could hardly be predicated on the actual developments thus far in the ore trade of 1910, nor on the programme of large interests as indicated by advance chartering of vessels. The United States Steel Corporation, unless there is some marked change in general business conditions, will move all the ore this year its dock and railroad facilities will permit. With 12,000,000 tons of its own carrying capacity, it might require 15,000,000 tons of outside vessel room, as has been talked of; but at this early day it would not be committed to any such volume of season charters, since a certain percentage of its ore is always provided for in "wild" charters.

If business conditions should be such as to warrant

a movement of 27,000,000 tons by the Steel Corporation, it would be entirely in bounds to predict a total of 50,000,000 tons from all Lake Superior mines, since in the past half dozen years the Steel Corporation has shipped slightly more than 55 per cent. of the total. But the course of the iron trade in the next six or seven months will certainly be a large factor in shaping the ore programme of the Steel Corporation as of all other producers of Lake Superior ores.

The purchases of lake ores already made for this year have taken in for the most part ores suitable for Bessemer iron, comparatively low phosphorus basic iron and malleable Bessemer iron. The last two of the three classes of pig iron named would take in iron running under 0.20 per cent. phosphorus, as against 0.10 phosphorus for standard Bessemer iron. The higher phosphorus ores suitable for making foundry and mill irons have not been as freely taken up. Estimates by good authorities would indicate, indeed, that less than 60 per cent. of the probable supply of these latter ores has been bought for this year. The merchant furnaces which produce foundry and mill irons from Lake Superior ores are evidently waiting for more light on the course of business this year before committing themselves fully for 16 months ahead on ore supply. One of the questions still open is the extent to which furnaces in the Susquehanna, Lehigh and Schuylkill valleys of Pennsylvania will require lake ores in the ore year beginning May 1. The condition of the ocean freight market and the unloading facilities for merchant ore at Philadelphia are factors, as well as the ability of Spanish, Swedish and other sellers of foreign ores to make timely shipments of ores sold. The large buying of foreign ores by eastern Pennsylvania furnaces has introduced a factor into the foreign ore trade with which British and German buyers of the same ores are having to reckon. Sellers are now more independent, and prices have been raised somewhat.

As indicating how the Lake Superior ore shipments have compared with pig iron production in the United States in recent years, we append the figures from 1900 to 1909, inclusive, in gross tons:

	Lake ore shipments.	Pig iron production in United States.
1900	19,080,379	13,789,242
1901	20,615,907	15,878,354
1902	27,585,904	17,821,307
1903	24,308,510	18,009,252
1904	21,849,401	16,497,033
1905	34,384,116	22,992,380
1906	38,565,762	25,307,191
1907	42,266,668	25,781,361
1908	26,014,987	15,936,018
1909	42,500,000 (est.)	25,795,471

The average pig iron production for the 10 years is almost exactly 66 2-3 per cent. of the average of Lake Superior ore shipments. On that basis a 50,000,000-ton movement of lake ores this year would mean more than 33,300,000 tons of pig iron. If we take the figures of the past five years as a basis, the average pig iron production in that period being 63 per cent. of the lake ore shipments, we shall have a pig iron output of 31,500,000 tons corresponding to a 50,000,000-ton lake ore movement. The lowered iron content of lake ores has been more marked in the last five years than in the first five years of the above table; but, on the other hand, we have now to consider the increasing imports of Cuban, Newfoundland and European ores. On the whole, unless marked stimulus is given to the iron trade by developments of the next six months, the probabilities are that the shipments down the lakes this year will fall considerably short of 50,000,000 tons.

American and British Relations with Canada.

Canadian business interests appear to be somewhat stirred up with regard to possible developments in their trade relations with Great Britain and the United States. British manufacturers are reported to be contemplating the establishment of branch factories in Canada, while trade with the United States may be disturbed by the expected action of our Government in applying maximum rates of duty to Canadian products.

Our readers have been kept well informed through our regular Canadian correspondence with regard to the failure of the Canadian preferential duties to divert as much trade to Great Britain as had been expected when these duties were adopted. The Canadians, with a perversity that must seem exasperating to British manufacturers, have not only continued to purchase a large share of their requirements of manufactured products from the United States, but this share has been steadily increasing. Even the appointment of a British resident commissioner for the purpose of influencing Canadians to favor British manufacturers has accomplished little in that direction. Our Canadian neighbors have persisted in maintaining their close relations with trade interests on this side of the border, evidently having found it to their advantage to do so, notwithstanding the fact that their own Government was imposing lower duties on the competing British products. This appears to have been due to several reasons. The first of these is probably the element of time in making deliveries. Orders placed simultaneously in Great Britain and the United States naturally secure quicker deliveries from this country than from Great Britain by reason of the shorter distance. Next probably comes the disposition of our manufacturers to extend credit to Canadian buyers more generously than British manufacturers have been disposed to do. It is rather remarkable that the British have apparently been more cautious in extending credit to Canadian buyers than to buyers in other countries not under the British flag. Our people have found this willingness to give ample credit or long time for payment to buyers in South America, for instance, an element in such trade that has been exceedingly difficult to compete with. In the case of Canada, however, opposite conditions apply, probably due to a prejudice against Canadian credit, which has come down from the past when our northern neighbor was not in possession of such substantial resources as are now enjoyed. Another element which has operated in our favor is the interchange of population between the United States and Canada. Canadians remove to this country and Americans remove to Canada, while the people of both countries travel largely across the border. Thus an intermingling constantly occurs in both countries which cannot help influencing trade. Again, the close personal contact with our manufacturers enables Canadian buyers to get products made to conform exactly to their requirements, whereas much difficulty has been found in this respect in treating with British manufacturers.

The high duties which Canada is now imposing on

American products have in late years induced quite a large number of American manufacturers to establish branch factories in Canada. These enterprises, without exception, appear to be flourishing, and must, to a considerable extent, influence trade in related lines in favor of American products, as the management of such factories continues to be in American hands. This is probably attracting increased attention among British manufacturers, and may be one of the reasons why British manufacturers are now contemplating similar action.

It would be exceedingly unfortunate if at this time our Government should deem it necessary, under the provisions of the Payne Tariff act, to impose maximum rates of duty on Canadian products. This would unquestionably invite reprisals by Canada, thus greatly increasing the difference between the British preferential and the rates of duty our products would then be obliged to pay. In such an event it would seem that our people would have much more to lose than the Canadians. They purchase much more from us than we do from them. Canadian manufacturers would undoubtedly welcome such a development, as they would then be given increased protection in their home markets against American manufacturers. While the agricultural population of Canada might be relied upon to oppose such a movement, the influence of that section of the Canadian people would hardly be strong enough to cause the Canadian Government to refrain from taking such a step. National pride would count in a matter of this kind very strongly. It is to be hoped that before our Government acts decisively it will take counsel from important trade interests and not proceed to the extreme permitted by the Payne Tariff act. The Canadians have shown that they cannot be coerced into making tariff concessions to us. The wiser plan would be to offer concessions of such a character that they could not well be refused.

Modernizing Old Shops.

The owner of certain large machine shops, the equipment of which has been very completely modernized during the past few years, has made a careful study of the results, and has come to the conclusion that many establishments are enlarged in floor space where the better plan would have been to concentrate manufacturing through the medium of better machinery. In his own works he has carried out this policy in every department, until a remarkable assemblage of modern tools has been created, constituting a notable exposition of the best types of American metal working machinery. His theory is that the less association with the past which is permitted to remain in the modernized shop, the better the influence. Intimate contact with the best of machinery begets a high standard as applied to the product manufactured. Both the workmen in the shop and the engineers of the drafting room show it in their work. In this plant a line of woodworking machinery was to be developed out of the rut of years, and simplified to procure specialization in a few standard types. The element of the modern shop went hand in hand with that of a modernized product. The latter stands to-day almost alone in its field, and a large part of this success is attributed to a willingness to give to the men the best tools available for the work. The capacity of the same amount of space has been more than doubled without any crowding. Costs have decreased proportionately. The high class machine tool, coupled with progressive methods and a good cost system, has produced a revolutionary effect.

It is contended that no better results could have been obtained by building a new plant, and certainly no gain would have been achieved by enlargement of the old shops, for experience has demonstrated that no additional space was necessary. Very few cases are known where this sort of treatment has been given to an old plant. In fact, inquiry has failed to reveal a single instance where an owner has put aside all the influences of old buildings and traditions, and throwing out everything, filled the floors with the latest machinery. The moral is that a manufacturer should not turn too quickly to shop extensions. He had better first ascertain if he would not make a more profitable investment by putting the extension money into machinery that will do more work, enlarging capacity without increasing the building investment item. If his machinery is really modern, further concentration is difficult. If it is not, then no great amount of investigation would be required to prove that he can considerably increase his production on the same floor space, and at the same time reduce his costs, not only as compared with what he has been doing, but also as compared with what would come with the unnecessary expansions of buildings.

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Elliptical Shafts and Tool Shanks.

To the Editor: I have for many years advocated the use of elliptical and equivalent sectional forms for machine feed traverse, line and other shafts; drill, reamer and tap shanks and sockets (parallel and tapered, as desired), to avoid slipping of pulleys and gears on shafts without using splines, keys or screws, and the use of driving tips on drills and sockets, and the costly drill chucks now so much used. Why are these obvious improvements so neglected by those who foot the bills for less efficient and more costly methods? These sections can be bored and turned as accurately and cheaply as circulars of equal area. There is a company doing such work and supplying attachments to lathes for the purpose, but it meets with little encouragement, possibly because the attachment, though efficient, is unnecessarily costly, amounting to about 50 per cent. of the cost of the lathe. Still, as it will last as long as the lathe it would be a good investment and soon pay its cost in a large establishment by doing away with broken drill and socket tangs and the breaking of small drills caused by slipping in chucks, &c. Will some of the bill distributors kindly throw light on this matter?

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Canada and the United States Tariff.

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That the difference between the minimum and the maximum duties would be a heavy additional handicap on Canadian enterprise in the selling of goods in the United States is recognized, but there are other considerations that outweigh this in the minds of thinking Canadians. In the first place, there is a suggestion of external pressure that is not relished. The people of Canada do not like to have it hinted to them that unless they do so and so some other country will impose penal duties. Were the government of great Britain itself to act in such a way Canada would not less resent it. In the second place, the sense of the injustice that would be done by imposing the United States maximum duties on imports from Canada is keen. Canada does not discriminate against the United States. It subjects no imports from the United States to duties higher than those it imports from other foreign countries, save those countries that are entitled to most-favored-nation treatment. Further, Canada's duties on imports from the United States are more favorable to the latter country than would be Canadian duties that are the equivalent of the United States minimum tariff. Thus there is not on Canada's part either discrimination against, or lack of reciprocity toward, the United States. Hence, the suggestion that the Canadian Government should approach the United States Government with something like a petition for the privilege of the latter's minimum tariff is not liked.

Besides this feeling, which prevails without regard to general views on the question of trade policy, there is the strong protectionist sentiment to be considered. That sentiment is particularly vigorous as toward the United States. The demand for higher duties for the protection of the home market would be practically satisfied if the duties were raised sharply on imports from the United States alone, that country being the principal external source of competition in the Canadian market. That being so, it will be understood that the idea of a tariff war between Canada and the United States would be by no means repugnant to a large number of Canadian manufacturers. Generally speaking, these manufacturers could not hope to get any considerable footing in the market of a manufacturing country like the United States, even though no higher duties had to be paid than those of the minimum tariff. What the Canadian manufacturers are chiefly concerned for is their ascendency in the home market. From their point of view, therefore, it is much more important that the Canadian duties on United States manufactured products should be high than that United States duties on Canadian products should be low. If the United States subjects imports from Canada to the maximum duties, Canada will almost certainly subject imports from the United States to the surtax. That would be satisfactory to Canadian manufacturers, who are finding United States competition very active in the Canadian West, in all the Canadian mining fields where a plant is required, in the power equipment business, and in the supplying of railroad and other building contractors.

Especially to the advantage of Canadian steel manufacturers would be the imposition of the surtax on United States goods. The United States is of course the country from which nearly all Canada's imports of iron and steel come. Germany's steel trade was gaining ground here very fast until it was suddenly stopped by the application of the surtax. Britain's steel exports to Canada might have expanded of late but for the action of the North Atlantic Steamship Conference in raising ocean freight rates on all west bound traffic by very great increases. On pig iron and all forms of steel, which once were carried across as ballast, the freight rates are now almost prohibitive. They have become so high and are in so much danger of being further increased that Canadian importers of British goods as well as British exporters to Canada, are joining in strong representations to the Canadian government for the correction of the grievance.

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The contract for the entire electric power equipment has been placed with the Westinghouse Electric & Mfg. Company, and consists of two 1500-kw. low pressure turbine units, three-phase, 25-cycle, 2400-volt, and one high pressure unit, three-phase, 25-cycle, 2400-volt, and also two 750-kw. rotary converters and necessary transformers. A feature in connection with the electrical installation is that the low pressure turbine will be operated on exhaust steam from the engines which drive the blooming and billet mills, thus effecting a large saving in fuel.

The contract for the blooming mill equipment has been placed with the United Engineering & Foundry Company, Pittsburgh. It includes a 48-in. blooming mill of improved design, together with the necessary equipment of shears, tables, &c., and a 24-in. special sheet bar and billet mill, with its tables and other accessory machinery. This equipment will be used for making sheet bars, slabs and billets.

The contract for the hot and cold mills has been placed with the National Roll & Foundry Company, Pittsburgh, with works at Avonmore, Pa., calling for four 26-in. cold mills and 16 31-in. hot mills, together with complete equipment for them. This is one of the largest single orders for sheet mills ever placed, and is probably the largest order, with the exception of that given by the Colorado Fuel & Iron Company a few years ago, which called for 29 mills.

The Berger Mfg. Company, sheet metal products, Canton, Ohio, announces the opening of a branch office at Kansas City, Mo., in charge of C. M. Kennedy, formerly manager of the Minneapolis branch office of the company. The new office will take care of the large growing trade in Kansas City, Nebraska and southern Iowa. Quarters have been secured in the Dwight Building, where Mr. Kennedy is already at work with a force of competent assistants. For years the company's line of manufactured products has received very favorable consideration in that section, and it has been decided that better attention should be given in view of the loss of time in taking up matters with the home office.

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The contract for the entire electric power equipment has been placed with the Westinghouse Electric & Mfg. Company, and consists of two 1500-kw. low pressure turbine units, three-phase, 25-cycle, 2400-volt, and one high pressure unit, three-phase, 25-cycle, 2400-volt, and also two 750-kw. rotary converters and necessary transformers. A feature in connection with the electrical installation is that the low pressure turbine will be operated on exhaust steam from the engines which drive the blooming and billet mills, thus effecting a large saving in fuel.

The contract for the blooming mill equipment has been placed with the United Engineering & Foundry Company, Pittsburgh. It includes a 48-in. blooming mill of improved design, together with the necessary equipment of shears, tables, &c., and a 24-in. special sheet bar and billet mill, with its tables and other accessory machinery. This equipment will be used for making sheet bars, slabs and billets.

The contract for the hot and cold mills has been placed with the National Roll & Foundry Company, Pittsburgh, with works at Avonmore, Pa., calling for four 26-in. cold mills and 16 31-in. hot mills, together with complete equipment for them. This is one of the largest single orders for sheet mills ever placed, and is probably the largest order, with the exception of that given by the Colorado Fuel & Iron Company a few years ago, which called for 29 mills.

The Berger Mfg. Company, sheet metal products, Canton, Ohio, announces the opening of a branch office at Kansas City, Mo., in charge of C. M. Kennedy, formerly manager of the Minneapolis branch office of the company. The new office will take care of the large growing trade in Kansas City, Nebraska and southern Iowa. Quarters have been secured in the Dwight Building, where Mr. Kennedy is already at work with a force of competent assistants. For years the company's line of manufactured products has received very favorable consideration in that section, and it has been decided that better attention should be given in view of the loss of time in taking up matters with the home office.

Customs Decisions.

Alloy of Iron and Cerium.

The Board of United States General Appraisers has handed down a decision overruling a protest filed by the American Express Company and sustaining the decision of the Collector of the Port. The merchandise in question consists of a metal alloy of iron and cerium. It was imported in slabs or ingots and duty was assessed at 45 per cent. under the provisions of paragraph 193 of the Dingley tariff as "manufactures of metal." The importer claimed this to be dutiable properly at 20 per cent. under Section 6, or at 30 per cent. under Paragraph 421 of the same act. While the Board of Appraisers does not consider that the paragraphs of the act, cited in the protest, offer a proper tariff classification for the merchandise, attention is called to the fact that provision for proper classification can be found in Paragraph 183 for "metals unwrought, not specially provided for," but to which the protestant makes no reference. In handing down the decision, General Appraiser Fischer says: "In its imported condition the alloy metal in question is the 'material' metal, rather than a 'manufacture' of metal. It is not disputed that it is to be used solely as a raw material, and we regard a metal of this description as an ordinary or commercial form of an alloy metal."

Fish Hooks.

The same general appraiser has handed down a decision sustaining in part a protest filed by Abbey & Imbrie, New York, regarding fish hooks made from round iron or steel wire, upon which duty was assessed at the rate of 40 per cent. ad valorem and 1¼ cents per pound under the provisions of Paragraph 137 of the Dingley act. The importers claimed that the wires from which the hooks were made is valued at not more than four cents per pound, and that the merchandise therefore is dutiable only at the specific rates named in the first part of said paragraph plus the 1¼ cents per pound.

Steel Points.

The assessment of duty on small stud-like articles of steel or so-called steel points, at the rate of 45 per cent. as "manufactures of steel," is the subject of a protest filed by an importer, who among other things claims that the steel points are classifiable as "steel nails." The merchandise in question is of the same general character as that previously held to be dutiable at 2¼ cents per pound as "other wrought iron or steel nails not specially provided for." That claim in the protest is sustained and the nails or so-called rivets or points may be taken at 3½ lb. to the 100 gross.

Steel Forgings.

Judge Martin in the United States Circuit Court, Southern District of New York, January 27, 1910, handed down his decision in two cases against Thomas Prosser & Son, involving the rate of duty on steel crank shafts, crank axles, piston rods, connecting rods and crossheads, which were invoiced under their respective names. The importers contended that they should have been assessed as forgings of steel at 35 per cent. ad valorem under paragraph 127 of the tariff act of 1897. Members of the Board of Appraisers disagreed as to which rate of duty should be assessed. The board which the Court of Appeals held was the lawful board to consider the subject held that the merchandise in question are forgings, while the Government in its appeal insisted upon a classification as "manufactures of metal," under paragraph 193. The decision was in part as follows:

> The importers' evidence tends to show that anything that was once a forging is always a forging. If this contention prevails, the blade of a jackknife, having been made of a forging, remains a forging. Under such a construction of the law, the provision in paragraph 193 that iron or steel partly or wholly manufactured shall be assessed at 45 per cent. ad valorem is practically without application, or if it has any application it is certainly unjust in that a piece of steel that has found its way into a manufactured product and escaped the forging processes must pay a duty of 45 per cent. ad valorem, while if it has once been a forging the duty shall only be 35 per cent. ad valorem. This would be crude legislation and illogical, and, in my opinion, it is an unwarranted construction.
>
> The evidence on the part of the Government is that forgings like a steel billet cease to be such when they have advanced to a more finished or perfected article. As I construe these two paragraphs, it is a question of fact as to whether these articles after having been forged were so far developed by a finishing process that they have been advanced from the condition of a forging to that of a manufactured metal. The evidence seems to be conclusive that the articles in question were designed for use in steam engines and were so far completed as to be practically ready for use. Under the facts developed by the evidence these articles should be classified as manufactured metal unless we adopt the importers' view—once a forging always a forging—and in that I do not concur. It is not in harmony with the decision of the Supreme Court in Saltonstall *vs.* Wiebusch (156 U. S., 601).
>
> The decision of the Board of General Appraisers is overruled, and the assessment of duty by the collector at 45 per cent. ad valorem, under paragraph 193, is affirmed.

The Central Foundry Company in Receiver's Hands.

On petition of several small creditors February 11 Judge Hough of the United States Circuit Court, New York, appointed Waddill Catchings receiver of the Central Foundry Company. This company, whose main office is at 37 Wall street, New York, owns cast iron, water and soil pipe foundries in various parts of the country. The petition for a receiver is stated to have been entirely of a friendly character, and the receivership has the purpose of bringing about a reorganization of the company, which will clear off a troublesome floating indebtedness and enable it to continue business on a sounder basis. The receiver is authorized by the court to continue the business of the company and to issue receiver's certificates in an amount not to exceed $200,000 for this purpose.

The president of the Central Foundry Company is August Heckscher, a very successful business man, who is interested in numerous other manufacturing enterprises, none of which is involved in the difficulties of the Central Foundry Company, and that even the subsidiaries of that company, the Central Radiator Company and the Central Iron & Coal Company of New Jersey, would not be disturbed by the receivership. Receiver Catchings says: "There will be no interruption in the operation of the plants. All orders will be filled promptly, and the receiver will take new business. Although there is little cash on hand, the accounts receivable are substantial, and the collections should, to a great extent, supply the necessary funds for the continued operation of the business."

The Central Foundry Company is capitalized at $6,620,000 7 per cent. preferred stock and $6,489,000 common stock, of which all is outstanding except $380,000 of the preferred and $350,000 of the common, which is held in the treasury. The company has also outstanding $3,861,000 6 per cent. debenture bonds and an unsecured indebtedness of $540,000, besides a secured indebtedness of $345,000.

The petition for a receiver placed the liabilities above $4,561,000 and stated the assets to be at least $1,000,000 above the value of the various plants, which are located in New York, New Jersey, Indiana, Maryland, Tennessee and Alabama. It is stated that united action on the part of creditors and stockholders can promptly make effective a reorganization which will admit of large economies and better earnings.

The January product of the open hearth steel department of the Pennsylvania Steel Company at Steelton, Pa., was exceptionally heavy for that month. In fact the whole plant is producing largely.

The American Iron & Steel Mfg. Company.

The tenth annual report of the American Iron & Steel Mfg. Company, Lebanon, Pa., presents the following balance sheet, as of December 31, 1909:

Assets.

Current assets:		
Cash in banks	$594,872.99	
On hand	1,228.85	
		$596,101.84
Bills receivable		11,553.04
Accounts receivable, net		673,302.99
Inventory		2,143,183.40
Insurance and taxes, unexpired value		7,300.46
		$3,431,441.73
Fixed assets:		
Real estate, plants and equipments	$5,675,166.86	
Less allowance to provide for depreciation	805,000.00	
		$4,870,166.86
Total		$8,301,608.59

Liabilities.

Current liabilities:		
Wages accrued, not due	$90,998.02	
Accounts payable	134,728.89	
		$225,726.91
Capital liabilities:		
Capital stock, authorized and issued—		
Preferred	$3,000,000	
Common	2,550,000	
		$5,550,000.00
Undivided profits at this date, subject to the payment of dividends on preferred and common stock, authorized but payable January 1, 1910		2,525,881.68
		$8,075,881.68
Total		$8,301,608.59

President James Lord says: "The depression in the industry, so apparent throughout 1908, continued during a portion of the past year, with a return to normal conditions as to output during the last half. Special dividends, amounting to $221,625, were paid during the year in addition to the regular dividends. Additions were made to plants and equipment amounting to $181,888.12. The allowance for depreciation of plants and machinery now amounts to $805,000. The losses from uncollectible accounts amounted during the year to eight one-thousandths of 1 per cent. of the sales."

Pennsylvania State Taxation Matters.

HARRISBURG, PA., February 15, 1910.—Considerable interest is being manifested by State officials and iron and steel manufacturers in this part of Pennsylvania in the work of the State Taxation Law Revision Commission, which is engaged in an exhaustive study of the subject of taxation preparatory to the recommendation to the next Legislature of bills for increasing the revenue of the Commonwealth. The commission is composed of legislators and will complete its report some time before the General Assembly meets in January, 1911. The whole subject of taxation is being carefully considered, and one of the most significant features of its recent work has been the series of inquiries made into the manner in which personal property is being taxed in Pennsylvania.

It has been found that owing to the lax methods of local assessors, in whose hands the assessment of such property is vested, millions of dollars' worth of school bonds are escaping taxation. They are not returned by their owners to the assessors and it appears to be the general rule that assessors do not look them up. As the school authorities do not report them to the fiscal officer of the State for taxation, the Commonwealth is not receiving a revenue which should be an important item in the annual receipts. The bonds of all industrial, transportation and public utility companies are taxed, the payments being made by the companies in the form of a State tax on loans. Municipal bonds are also taxed, but school securities are escaping.

It is believed here that should the bonds of all school districts be taxed there would be no occasion to tax the stock of manufacturing corporations which is now exempt, but biennially made the target of bills to tax it anywhere from 5 to 10 mills. Whether the commission will take this view or not is unknown.

Another important fact which may be given consideration is that while bonds, which are a mortgage on property, are taxed at 4 mills on the dollar, stock is taxed at 5. H.

British Trade in Canada.

TORONTO, February 14, 1910.—According to information that comes from a usually trustworthy source, it has been decided by a number of British manufacturers to set up branch works in Canada. It might seem that the Canadian tariff preference in Britain's favor would be a sufficient advantage for British merchants seeking to operate on the Canadian market. But the tariff is not everything. In spite of its large concessions to British goods, the preference did not cause such an expansion of Britain's trade in Canada as was looked for.

Mr. O'Hara, Canada's Deputy Minister of Trade and Commerce, has recently commented on the reluctance of British exporters to take chances on the credit of good Canadian mercantile firms. He mentioned the case of a London electric company that received an order for sample goods to the value of £1 8s. from an Ottawa house. The Ottawa concern received a reply in which payment was asked to be made against the bill of lading. This so offended the Canadian house that it wrote to the Deputy Minister upon the subject. This is an instance of a very common caution in respect to Canadian trade on the part of British firms. British exporters say that they are without adequate security for credit business in Canada. They think rather of past conditions than of present conditions; for, in times gone by, when the progress of this country was not far advanced there were losses incidental to British trade here. To-day, however, the risks are, relatively speaking, negligible. Merchants and manufacturers in the United States take them freely and without loss. That is one thing that helps to determine the balance in this market so strongly on the side of the United States as against Britain. It is expected, however, that British enterprise will become alive to the trade opportunities here, and that the competition from that quarter will become keen enough, at all events, to satisfy Canadian manufacturers. British houses are bidding more kindly for business in the mining fields of this country where machinery and plant are still in large demand and are likely to be in greatly increased demand. C. A. C. J.

Railroad Equipment Business.—In addition to the large inquiries for freight cars by the Baltimore & Ohio and the Southern Railway, involving a total reported at 15,000, the Chicago, Rock Island & Pacific is reported in the market for 1600 freight cars and 70 passenger cars. The Western Maryland is inquiring for 500 to 1500 cars. The recent Norfolk & Western order was distributed as follows: 500 gondolas and 1500 hopper cars from the Western Steel Company and 500 stock and 500 coke cars from the American Car & Foundry Company. The same road has ordered 40 freight locomotives from the Baldwin Locomotive Works and 10 passenger locomotives from the American Locomotive Company. The Rock Island has bought 75 locomotives from the American Locomotive Company; the Denver, North Western & Pacific, 20, and the New York, Ontario & Western, 6, from the same company.

The sale of the Bird Furnace at Ironton, Ohio, to D. C. Davies, H. A. Marting and others having been confirmed on the 14th inst., arrangements are being perfected for putting it in blast on basic iron some time in May.

An Allis-Chalmers Pumping Engine Test.

On January 4 and 5 an official test was made of the new high duty pumping engine recently installed in the North Point pumping station of the city of Milwaukee, Wis. This engine is of the vertical, triple expansion, crank and flywheel type, with a capacity of 12,000,000 gal. per 24 hours. It operates against a head of 275 ft. and receives steam at 125 lb. pressure. The guarantee calls for a duty of 165,000,000 ft.-lb. The engine was built by the Allis-Chalmers Company and is the fifth which has been installed at the North Point station by the same company. A duplicate of the unit just tested is now being built. The pumping engine which the company installed in 1892 became noted for the high duty of over 154,000,000 ft.-lb., which was the highest obtained up to that time. In speaking of this unit, Thomas McMillan, the chief engineer of the station, stated that the cylinder heads had never been removed in the more than 18 years in which the engine had been in service.

The test was started at 9.30 Tuesday morning and continued until 9.30 Wednesday morning. Charles J. Pietsch, city engineer of Milwaukee, supervised the test for the city, and William H. Getz represented the Allis-Chalmers Company. Thomas McMillan, who has been chief engineer of the station for nearly 40 years, personally looked after the operation of the engine. The test proved highly satisfactory both to the city and to the builder. During the continuous run of 24 hours the unit developed an average duty of 175,400,000 ft.-lb. per 1000 lb. of steam. This is 10,400,000 ft.-lb. more than guaranteed, and the pumping unit showed the highest duty of any in the station.

Concrete Standpipe for Storing Water.—The town of Emplame, Mexico, and the shops of the Cananea, Yaqui River & Pacific Railroad, now a part of the Southern Pacific Railroad of Mexico, also located there, are being supplied with water stored in a reinforced concrete standpipe, 90 ft. high and 30 ft. in diameter. The flow of water into and out of the standpipe is regulated by a Golden-Anderson controlling altitude valve, manufactured by the Golden-Anderson Valve Specialty Company, Pittsburgh. Around it there is located a standard 18-in. swing check valve. All flow into the tank passes through the altitude controlling valve which governs the elevation of the water in the standpipe, preventing it from overflowing and also acting as a stop when fire pressure is wanted in the mains. All flow out of the tank, when the altitude valve is closed, is through the 18-in. swing check valve, which, of course, closes as soon as flow starts into the tank. Golden-Anderson controlling altitude valves are also used on a steel standpipe of 160,000-gal. capacity at the Washington, D. C., terminal of the Pennsylvania Railroad Company and on the 300,000-gal. standpipe of the New York Central system, Buffalo, N. Y., in addition to many other smaller installations in various parts of the country.

Julian Kennedy, Pittsburgh, is preparing the plans for the two blast furnaces to be erected by the Rogers-Brown Iron Company at Buffalo. The new furnaces are to be similar in design and construction to those of the Buffalo & Susquehanna Iron Company, recently absorbed by the Rogers-Brown Iron Company, and which were also designed by Mr. Kennedy.

The Bethlehem Steel Company states that the reports concerning its strike have been greatly exaggerated. The strike is in its No. 2 machine shop at its Lehigh plant in South Bethlehem, Pa., and involves only between 800 and 900 men. It does not affect its structural department in any way. There is no trouble at the Saucon plant, where the structural work is done. The men there have no grievances.

Central American Notes.

SAN JUAN, C. A., January 11, 1910.—Much activity is displayed in the Esmeraldas District of Colombia and the output is expected to surpass that of last year. Several of the copper and iron properties in the adjacent territory have been taken up by Americans, and a San Francisco company will soon send down a shipload of machinery.

The continuation of the revolt in the eastern section of Nicaragua has entirely unsettled business throughout the country. Many of the laborers at the mines and on the plantations have joined one of the two armies, and imports as well as exports have dwindled. Unless peace comes soon the country will be ruined. Arbitration by the American Government is hoped for by the people. Admiral Kimball, U. S. N., is praised on all sides for the just way he has conducted all negotiations with the Nicaraguans.

It is reported that Guatemala is in serious difficulties with Mexico, who wants to depose Cabrera. Such rumors naturally disturb business of all kinds in Guatemala, and it is to be hoped that this rich section will not be ravaged by war, especially when there are good prospects for the Pan-American Railroad to be continued by the new company southward from Chiapas to the northern sections of Guatemala. This line would only be a stone's throw from Salvador, where contracts are being made for the continuation of the Santa Ana Railroad (British) to the port of La Union, on the Gulf of Fonseca, Pacific Ocean.

If the Honduras Government is successful in financing its debt in New York, then another link will surely be put in the Pan-American Railroad from a point on the Union-Salvador line to La Brea and following the low coast to the Nicaragua frontier. An important branch will be the one from La Brea to Tegucigalpa and eastward to Puerto Cortes, on the Atlantic coast. This branch would thus traverse important mining (gold, silver, iron and copper), as well as agricultural regions. American engineers built a considerable part of the Cortes Railroad, which has been a feeder for all the cattle and coffee section within several hundred miles. Our business men are beginning to look into the possibilities of the Olancho and Yoro regions, where a large population could easily be supported by the mineral and cattle industries. Of course the extension of the Cortes Railroad would be a necessity, as all machinery is taken to the interior in bullock carts.

C.

The Petroleum Iron Works Company, Sharon, Pa., has recently completed two large steel storage tanks of 2,500,000 gal. capacity each, which are used for storing oil on the Island of Trinidad, by the asphalt interests, taking care of six oil wells. It is also furnishing converter work for the Edgar Thomson Works of the Carnegie Steel Company and storage tanks at Cleveland, O., Bayonne, N. J., and Newell, Pa., for California and for export. In addition it has recently completed a 24 x 100 ft. standpipe for the McKeesport Tin Plate Company, McKeesport, Pa., and a 6 x 165 ft. self-supporting steel stack for a manufacturer at Monessen, Pa., besides stack, tank and plate work for other interests.

The Oregon District members of the United Metal Trades Association of the Pacific Coast at a meeting at Portland February 3 appointed a committee of three to invite the co-operation of other organizations of employers in an effort to secure a differential of 5 per cent. on city and State work on goods and materials manufactured in Oregon. The matter of freight rates was also considered, and its importance was emphasized by statements as to the ability of Eastern manufacturers to compete with those in the Pacific States. President O. E. Heintz and Assistant Secretary F. C. Porter were appointed a Committee on Freight Rates from the East.

PERSONAL.

Walter E. Buckingham, who was recently connected with the Faitoute Iron & Steel Company, Newark, N. J., has been appointed district sales agent for the Lebanon Iron & Steel Company, with offices at 90 West street, New York.

Sanderson & Porter, 52 William street, New York, announce that Elwin C. Foster, recently president of the New Orleans Railway & Light Company, and formerly vice-president and general manager of the subsidiary companies of the Massachusetts Electric Companies, has become associated with them.

H. E. Obenshain, who for some time has been secretary and treasurer of the Screw Cutting Company of America of Philadelphia, Pa., resigned February 1 to accept the position of president of the Roanoke Iron Works, Inc., Roanoke, Va.

Robert Kann, consulting chemist to the Raritan Copper Works, Perth Amboy, N. J., has opened at 24 Cliff street, New York, a commercial laboratory, making a specialty of metallurgical analysis and research.

George A. Wardlaw, who for the past seven years has been editor of the *Proceedings* of the American Institute of Electrical Engineers, has resigned to become editor of the *Electrical Record,* 114 Liberty street, New York. Albert Spies, whom Mr. Wardlaw succeeds, becomes managing editor of *Foundry News,* 50 Church street, New York, a new monthly publication devoted to foundry practice, the first number of which will appear in April.

E. B. Boye, who has been manager of the Chicago office of the Warner & Swasey Company, Cleveland, Ohio, has succeeded David Hunt, Jr., as sales manager of the company at Cleveland. Mr. Hunt has become connected with the E. M. F. Company, Detroit, Mich.

E. M. Billings, formerly superintendent of the American Steel & Wire Company's wire mills at South Sharon, Pa., will take a similar position at the Aliquippa, Pa., plant of the Jones & Laughlin Steel Company March 1.

D. L. Eynon has resigned his position as superintendent of rolls and mills at the Passaic Steel Company's plant, Paterson, N. J., to become general superintendent of the Duplex Metals Company's works at Chester, Pa. The Duplex Company has been manufacturing a line of copper-clad steel bars and is now enlarging its plant to add the manufacture of steel and copper-clad shapes and specialties.

A. Falkenau, former president of the Falkenau-Sinclair Machine Company, Philadelphia, has associated himself with George K. Hooper, industrial engineer, 165 Broadway, New York City.

L. C. Corbus has been appointed purchasing agent of the Standard Sanitary Mfg. Company, Pittsburgh, effective from February 1. He is not new to this position, having discharged its duties for some time; in fact, since the resignation of his predecessor, but has not been given the title formally until now.

Elmer E. Billings, formerly superintendent of the wire nail mills of the American Steel & Wire Company, at South Sharon, Pa., will on March 1 take charge of the wire nail plant now being built by the Jones & Laughlin Steel Company, at Aliquippa, Pa.

Walter F. Schleiter, secretary of Dilworth, Porter & Co., manufacturers of railroad spikes, Pittsburgh, has been appointed a delegate to represent the United States at the International Railway Congress which will meet in Berne, Switzerland, in July.

J. L. W. Birkinbine, a member of the Birkinbine Engineering Offices, Philadelphia, has returned for a visit to his home, after devoting 16 months to coal explorations in the State of Oaxaca, Mexico, and reconnaissances for railroad routes to the Pacific Ocean and to the prominent cities of Mexico. Mr. Birkinbine is chief engineer of the Oaxaca Iron & Coal Company, which has carried on extensive investigation by drifts and by diamond drills to develop an additional fuel supply, much needed by Mexico.

William Lodge of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, is spending a few months in Cuba.

Max H. Wickhorst, Aurora, Ill., engineer of tests of the Chicago, Burlington & Quincy Railway Company, has been appointed chief chemist in charge of rail tests of the American Railway Engineering and Maintenance of Way Association. He has been given a year's leave of absence from the Aurora laboratories to take up this special work. Mr. Wickhorst is a member of several committees of the American Society of Testing Materials, including that on Standard Specifications for Iron and Steel, which has dealt chiefly with rail specifications.

David Hunt, Jr., has resigned as sales manager of the Warner & Swasey Company, Cleveland, Ohio, to take a position with the E. M. F. Company, manufacturer of automobiles, Detroit, Mich. E. B. Boye, who has been branch manager of the Warner & Swasey Company, at Chicago, will become its sales manager, and will make his headquarters at Cleveland.

Hugh Wilson, vice-president of the Barney & Smith Car Mfg. Company, Dayton, Ohio, has resigned to take the position of vice-president of the McGraw Publishing Company, owner of the *Electrical World, Engineering Record and Electric Railway Journal.*

E. E. Porter, manager of the Wooster Machine Company, Wooster, Ohio, has sold his interest in that company and gone to California for his health. He is the inventor of the Wooster roller for pulverizing.

J. M. Blower, general manager of the Hisylvania Coal Company, Trimble, Ohio, has invented a steel tie which has been used in a stretch of track at the company's mines, and is said to have successfully met requirements.

Edward J. Etting, Philadelphia, Pa., has been appointed American representative for Wrenn, Snow & Co., London, England, for the sale of their Greek and Spanish iron ores.

The American Steel Foundries Wins Its Simplex Bolster Suit.—In the suit of the Simplex Railway Appliance Company against the Pressed Steel Car Company, Judge Hazel of the United States Circuit Court has granted a decree in favor of the former, with costs against the defendant. Suit was brought for infringement of a patent for a metallic car truck bolster. The decree enjoins the Pressed Steel Car Company from further use of the device and orders an accounting. In connection with this suit a director of the American Steel Foundries says: "The Simplex Railway Appliance Company is owned entirely by the American Steel Foundries, and this decision is of great value in establishing its exclusive right to make a certain very popular type of freight car truck bolster."

Harrisburg iron and steel manufacturers will present briefs and arguments against the transfer charges of the railroads in the Pennsylvania State Capitol before the State Railroad Commission the latter part of this month. Complaint was made by seven firms that the charge of 80 cents a ton is exorbitant.

Plans are under way for the building of a large hotel at Youngstown, Ohio, which is to be named the Butler, in honor of Joseph G. Butler, Jr., chairman of the Bessemer Pig Iron Association.

OBITUARY.

ZALMON G. SIMMONS, president of the Simmons Mfg. Company, Kenosha, Wis., died February 11, aged 82 years. He was one of the best known business men in the Northwest, having been a pioneer in railroad and telegraph construction. He was one of the projectors and principal owners of the cog railroad running to the summit of Pike's Peak in Colorado. Many incidents are related of his generosity and interest in public affairs. At one time when the city of Kenosha was threatened with insolvency he assumed the bonded indebtedness, which was eventually redeemed by the city. Although it had been impossible for him to enlist in the Civil War, he was noted for generosity in caring for old soldiers and erected at his own expense a handsome monument in Kenosha, as well as a library building, which he gave to the city as a memorial to his son. He was exceptionally regardful of his employees' welfare.

JAMES SMITH, Pittsburgh, formerly secretary of the Oliver Iron & Steel Company, died February 11, aged 66 years. He was born in County Tyrone, Ireland. In 1866 he came to this country and settled in Philadelphia, where he remained for a year. He then removed to Pittsburgh. One year later he entered the employ of the Oliver Iron & Steel Company, serving in various capacities until he was made secretary. This position he retained until 1892, when he resigned to engage in other business. He leaves a widow and three children.

WILLIAM H. BAILEY, Wheeling, W. Va., died suddenly February 9, aged 66 years. At the time of his death he was mill manager for the Whitaker-Glessner Company. He began his business career in Pittsburgh, and resided in that city until 1892, when he went to Muncie, Ind., to become superintendent of the mills of the Midland Steel Company. He was afterward superintendent of mills at Piqua and Canal Dover, Ohio. Six years ago he took the position he held at the time of his death. He leaves two daughters.

HENRY ADLER, Pittsburgh, one of the pioneer stove manufacturers of that city, died February 13, aged 77 years. He was born in Germany and settled in Pittsburgh more than 40 years ago. He engaged in the business of making fenders, and later organized a company to manufacture gas stoves, located near First avenue and Wood street. Some years ago the company built a new and larger works at Carnegie, Pa., and operated under the name of the H. Adler Company, of which he was president. He was one of the largest personal collectors of hand-carved ivories, hand-turned woods and Japanese bronzes in the country. He leaves three sons and three daughters.

LEMUEL C. WILLARD, secretary of the Willard Sons & Bell Company, manufacturer of car and locomotive axles, South Chicago, died February 10, aged 47 years.

JAMES CROTHERS REYMER, vice-president of the Pittsburgh Mfg. Company, died suddenly February 6, aged 76 years. He was a native of Pennsylvania. Becoming foreman in the machine shops of the Fort Pitt Foundry & Machine Company, he had in charge the manufacture of a large number of pieces of heavy artillery used in the Civil War. He then associated himself with the Pittsburgh Mfg. Company. He leaves a widow and two sons.

WILLIAM A. PAXTON, JR., president Paxton & Vierling Iron Works, Omaha, Neb., died January 31.

ADAMS CROCKER, Fitchburg, Mass., president of the Union Machine Company and the Union Screen Plate Company, died February 7. He was formerly engaged in the textile business, but 10 years ago transferred his energies to paper machinery manufacturing.

WHEELOCK T. BATCHELLER, Winsted, Conn., died February 8, aged 69 years. Trained as a scythe maker, he became manager of the Thayer Scythe Company after the Civil War, in which he had risen to the rank of lieutenant-colonel. From 1882 to 1889 he was manager of the George Dudley & Son Company, and was interested in other industrial companies. He was active in philanthropic affairs.

JOHN MEANS, a pioneer iron master of southern Ohio, at one time president of the Low Moor Iron Company, and at another time of the Ashland Iron Mining Company, died at his home in Ashland, Ky., Februrary 14, aged 80 years.

The International Harvester Company.

The preliminary statement of the International Harvester Company, submitted to the New York Stock Exchange in its application to list $20,000,000 additional common stock, shows net profits for the year ended December 31, 1909, of $14,760,000. Deducting preferred dividends of $4,200,000, there remains a balance of $10,560,000, a sum equal to 17.6 per cent. on $60,000,000 common stock. The common stock dividend of $20,000,000 is deducted from the total surplus and transferred to the capital stock of the company, leaving a final surplus of $7,250,000.

The preliminary income account for the year ended December 31, 1909, compares as follows:

	1909.	1908.
Net profit	$14,760,000	$8,885,683
Preferred dividends	4,200,000	4,200,000
Surplus	$10,560,000	$4,685,683
Previous surplus	16,690,000	12,006,306
Total surplus	$27,250,000	$16,691,989
*Stock dividend	20,000,000	.....
Net surplus	$7,250,000	.....

* Stock dividend payable to common stockholders of record February 3, 1910.

The preliminary combined balance sheet of the company as of December 31, 1909, compares as follows:

	1909.	1908.
Assets.		
Property account	$66,500,000	$63,680,776
Deferred charges to operation	200,000	189,683
Insurance fund assets	1,050,000	400,832
Inventories, bills and accounts receivable	99,400,000	83,998,286
Cash	5,100,000	9,339,055
Totals	$172,250,000	$157,608,632
Liabilities.		
Preferred stock	$60,000,000	$60,000,000
Common stock	60,000,000	60,000,000
Purchase money obligations	2,250,000	.....
Preferred dividend payable	.....	1,050,000
Bills and accounts payable	11,500,000	13,016,051
Reserves	11,250,000	6,850,540
*Surplus	27,250,000	16,691,989
Totals	$172,250,000	$157,608,632

* Before declaring stock dividend of $20,000,000 on common stock.

A New High Speed Tool Steel.—The Electric Steel Company of New York, incorporated with a capital of $100,000, is now building a plant at New Milford, Conn., for the manufacture of a new high speed tool steel under a process invented by Louis Auricchio. Crucible furnaces will be installed, and the company expects to be able to begin to make deliveries of its product shortly after April 1. All contracts for machinery and equipment have been placed. The president of the company is J. P. Hopson, for a number of years superintendent of the Harlem Division of the New York, New Haven & Hartford Railroad. The treasurer is W. J. Du Bois, general manager of the American Mail Steamship Company. The directors comprise the two gentlemen named, with William Wallace and J. F. Robinson. The main office of the company is at 42 Broadway, New York. Specimens of the steel made in an experimental furnace have been tested by important consumers, and it is stated that the results obtained were exceptionally satisfactory.

NEWS OF THE WORKS.

Iron and Steel.

No. 1 furnace of the Republic Iron & Steel Company at Haselton, Ohio, which has been out of blast for relining and repairs, was blown in last week.

No. 2 blast furnace of the Andrews & Hitchcock Iron Company, at Hubbard, Ohio, which has been practically rebuilt since it went out of blast some time ago, is about ready for operation and will go in blast this week.

Temple Furnace of the Temple Iron Company, Reading, Pa., has gone out of blast for repairs to the blowing engine and to the furnace lining.

It is expected that the Reading Iron Company's Collinwold Furnace, at Emaus, Pa., will be blown in in the latter part of February.

The Southern Iron & Steel Company has blown in the blast furnace at its Alabama City, Ala., plant, making three furnaces now in blast. The blooming mill of the steel plant at Alabama City is about ready to start on the rolling of ingots accumulated when the steel plant was last in operation, and later the open hearth furnaces will be started. It is expected that the wire mill will be in operation in 60 days.

The new plant of the Phillips Sheet & Tin Plate Company under erection at Weirton, W. Va., for some months is nearing completion and will be put in operation at an early date. It is located about one mile up the Cumberland branch from the main line of the Pan Handle Railroad, within four miles of Steubenville, Ohio, directly on the Ohio River. The plant will contain 10 hot mills and 10 cold mills, the hot mills being driven by a 32 and 54 x 60 in. twin tandem compound engine. The mills will be connected direct to the engine, five on each side. The driving engine was built by the Wisconsin Engine Company, Corliss, Wis. The boiler plant contains 3000 hp. Stirling boilers. The main hot mill building is 60 x 500 ft., with two 30-ft. lean-tos. The annealing and cold rolling building is about 80 x 400 ft., tin house about 300 ft. long and the assorting and warehouse about the same. The plant will burn coal throughout. Water will be furnished by the company's own pumping plant, which will consist of two centrifugal pumps, electrically operated.

George J. Hagan, Pittsburgh, has received a contract from the Sligo Iron & Steel Company, Connellsville, Pa., for the erection of a coal fired faggot heating furnace, making the third contract received for similar furnaces from this concern within the past six months.

The furnace of the Southern Iron & Steel Company at Alabama City, Ala., was blown in on basic iron on February 8.

Alice Furnace of the Tennessee Coal, Iron & Railroad Company, at Birmingham, Ala., has been changed from foundry to basic iron.

General Machinery.

The Thomas Carlin's Sons Company, N. S., Pittsburgh, Pa., reports business considerably improved, the following being a list of contracts recently secured: Two 9-ft. dry pans and a 9-ft. automatic pan, each to be driven by a 40-hp. Westinghouse motor, for shipment to the Forged Steel Wheel Company, Butler, Pa.; a 7-ft. stationary pan, driven by a 35-hp. motor, for Canada; an 8-ft. wet grinding pan for a Western brick manufacturer; three large feed water heaters, of plate and cast steel construction, for the Jamison Coal & Coke Company; a No. 38 motor driven shear to cut 1¾-in. material and two No. 18 motor driven shears to cut 2¼-in., for a large Chicago machine tool builder; one No. 64 shear, with 14-in. knives, belt drive, to cut 2½-in., for a Pittsburgh firm; one No. 18 shear, to cut 2¼-in., with 15-hp. Westinghouse motor, for Reading, Pa.; one No. 26, to cut 1½-in., motor driven, two 8000-gal. oil storage tanks, besides other contracts for tanks, stacks, castings for steel works, &c.

Among contracts recently secured by the Lewis Foundry & Machine Company, Pittsburgh, with works at Groveton, Pa., are the following: For the Blue Island Rolling Mill & Car Company, Chicago, Ill., 20-in. train of three stands with necessary pinion housings, rolls and motor driven shear; Sapulpa Steel & Iron Mills, Sapulpa, Okla., 20-in. train of three stands with necessary rolls—12-in. roughing with 9-in. four-stand finishing mills with shears to cut 5 in. square, 3 in. square and 1¾ in. square, also large roll lathe; Leechburg Steel Company, 12-in. motor driven roll train; Franklin Steel Company, 9-in. train and drive; Bethlehem Steel Company, angle bending machine, motor driven, of the last design suitable for 6 x 6 angles, and in addition considerable miscellaneous material.

The Steel Car Forge Company, Elwood City, Pa., has a number of important improvements to its plant under consideration, including the installation of three new steam drop hammers, the building of some warehouses and the enlarging of the capacity of railroad siding. All new equipment to be installed has been contracted for.

Foundries.

Apparatus required for the new foundry building of the Tarrant Foundry Company, Chicago, will include three electric cranes of 5, 10 and 15 tons capacity, with back geared motors, to be used inside, and two large yard cranes, also two cupola furnaces and a hoist and skipway for elevating charges to them.

A small cupola furnace is needed by the Ruggles Machine Company, Poultney, Vt.

The pattern shop and foundry of the Lee Foundry Company, Anniston, Ala., which recently burned, will be rebuilt for larger capacity. Electric power is to be used. A cupola furnace, crane, compressor, &c., are among the requirements of the plant.

The Heath Foundry & Mfg. Company, Plymouth, Ohio, whose requirements were recently mentioned, has purchased a direct current generator of 50 hp.

Machinery will be needed this spring by the Thomas & Albright Foundry Company, Goshen, Ind., for a new casting plant and machine shop if present plans for a new building are carried out.

The Racine Foundry Company, Racine, Wis., has been organized with a capital stock of $40,000 to manufacture auto and motor cycle cylinders. The company will erect a foundry and machine shop, plans for both buildings being in preparation. It is in the market for all kinds of foundry equipment, machine tools and shop supplies. R. R. Birdsall is president. Catalogues, &c., are requested.

The Scott-Madden Iron Works, Rushville, Ind., has just made its largest casting, weighing 8000 lb.; eighteen of the same size will be made. The plant has orders for months ahead.

The Enterprise Foundry & Fence Company, Indianapolis, Ind., has bought the property of the Mainland Mfg. Company at Twenty-fourth and Yandes streets and will erect a new plant. The property is 400 x 650 ft. The company has been for several years on South Senate avenue.

Power Plant Equipment.

From Marshall, Mich., it is reported that the Homer Gas Engine Company will establish there an electrically operated plant of larger capacity than that now operated at Homer, Mich.

Bridges and Buildings.

The Decatur Bridge Company, Decatur, Ill., is contemplating the erection of an office building, 30 x 50 ft., two stories, and the erection of an addition to its shop, 70 x 96 ft., of brick and steel construction.

A. E. Priest, Lexington, Ky., has organized the Priest Bridge Company, with headquarters at Lynchburg, Va., to fabricate and erect steel bridges. No details as to plant equipment have been given out.

The York Bridge Company and the S. Morgan Smith Company, both of York, Pa., have filed official notices of increase of stock. The former increased from $220,000 to $320,000 and the latter from $625,000 to $1,000,000.

Fires.

The Bessemer & Lake Erie Railroad Company suffered a $50,000 loss by fire in its Greenville, Pa., machine shop.

The Pusey & Jones Company, Wilmington, Del., suffered a $5000 fire damage in its machine shops.

The smelting works of Henry K. Fort, Philadelphia, Pa., were recently destroyed by fire. The estimated loss is $10,000.

The St. Louis, Iron Mountain & Southern Railroad Company lost by fire its roundhouse and some of its shop buildings at Little Rock, Ark., February 11. The estimated loss is $40,000.

Miscellaneous.

The Gardner Machine Company, Beloit, Wis., will build a new plant of greatly increased capacity in the spring. The ground has been purchased and plans for the building are in course of preparation. The company will need considerable new equipment in the line of machine tools.

The Engineers' Supply Company, Kansas City, Mo., is contemplating the erection of a new plant this spring.

Hubert Meyers, formerly of the Warsaw Mfg. Company, Warsaw, Ind., has moved to Goshen, Ind., where he has organized the Meyers Mfg. Company to make hoisting and conveying machinery and pumps. The company is capitalized at $100,000. Buildings of a former manufacturing concern will be occupied by the new company.

The Gear-Scott Mfg. Company, Richmond, Ind., has completed satisfactory tests of a gasoline traction engine which will supersede steam traction engines, especially in countries where fuel and water are scarce. Albert Hammacher, the company's representative at Odessa, Russia, has been assisting in making the tests. The engines will be particularly fitted for the great wheat fields of that country.

The General Mfg. Company of Elkhart, Ind., has increased its capital stock from $50,000 to $100,000. A. T. Wells is president.

The G. M. Diehl Machine Company has completed its factory buildings at Wabash, Ind., and has started with over a score of machinists and is taking on others as fast as it can find them. It has work for 50, and there are orders enough ahead to make possible the employment of 100.

The Sullivan-Geiger Company, manufacturer of tin and sheet metal goods, Indianapolis, Ind., has purchased a site at

Madison avenue and Henry street for a three-story factory and warehouses. The company's plant is now on East South street.

It is reported from Grinnell, Iowa, that the Spaulding Mfg. Company of that place contemplates a further addition, 60 x 100 ft., to be used in the production of automobile parts.

The Earlington Machine Works, recently organized at Earlington, Ky., will require equipment before long for a shop 50 x 100 ft., which is to be erected this spring.

A new factory, 60 x 120 ft., is to be erected at Lansing, Mich., by the Michigan Screw Company. Power and operating apparatus will be needed.

The Pittsburgh Mfg. Company, Pittsburgh, Pa., has been awarded contract for a filtration plant of 6,000,000 gal. daily capacity to be built in connection with the municipal water supply works at Rock Island, Ill.

The General Air Product Company will locate a plant at Welland, Ont., adjacent to the works of the Ontario Iron & Steel Company, where it will use a by-product of the latter company for the manufacture of oxygen for use in the welding of steel.

The Michigan Screw Company, Lansing, Mich., will build and equip a three-story and basement factory, 60 x 120 ft. Bids for the building are now being received.

The John R. Keim Mills at Kensington avenue and the Erie Railroad Belt Line, Buffalo, manufacturers of pressed steel parts for automobiles and other pressed steel articles, have been acquired by the Ford Motor Company of Detroit, Mich., and hereafter various parts of the Ford motor car will comprise the entire product of the Keim plant. For this purpose the plant equipment and operating force is to be largely increased. The present working force of 600 men is to be doubled. A new company has been incorporated under the name of the John R. Keim Mills with an authorized capital of $500,000 to take over the business of the former company, of which Jno. R. Lee, president of the former Keim Mills, becomes president and treasurer; Norval A. Hawkins, Detroit, vice-president, and Wm. H. Smith, former general manager, will be general manager and secretary. The additional directors are Henry Ford and C. H. Willis of Detroit.

The Electro-Metallurgical Company, Niagara Falls, N. Y., manufacturer of ferrosilicon, has purchased the equipment and certain raw materials of the Susquehanna Smelting Company, Lockport, N. Y., which recently shut down its plant owing to the low price of its electrically smelted products, ferrosilicon, &c. A report was given out that there were prospects of a merging of the two concerns, but this has not been confirmed.

The Barnes Drill Company, Rockford, Ill., is building a new plant in that city. All its machinery will be motor driven. The company is in the market for power plant equipment, including boilers, heaters, 100-hp. Corliss engine and 75 to 100 kw. direct current generator. It is also taking estimates on a three-ton three-motor electric traveling crane of four tons capacity. The company is further considering the purchase of a couple of chucking turret lathes and other machine tool equipment.

Columbia University to Serve a Wider Public.

Announcement is made of an important extension of the work of Columbia University, New York, which will begin in September next. The new undertaking is an outgrowth of the success of the summer session of the university, which has been established for 10 years, and which in 1909 attracted 2000 students from all parts of the United States. It is now proposed to provide classes and laboratory work in the evening at the university, and both in the evening and during the day in other parts of the city, as well as in northern New Jersey and Westchester County, for the benefit of those who are not able to avail themselves of the regular courses of instruction at the university. In particular, evening classes will be organized where wage workers, as well as those who are engaged professionally or otherwise, during the day, may obtain the best instruction which the university can offer.

The field to be covered by this extension teaching will be very broad. There will be classes organized in languages, literature, history, economics and politics; in various scientific subjects, including electrical and mechanical engineering; in architecture, including drafting and design; in music and fine arts; in preventive medicine and sanitary science; in manual training and the household arts in teaching; and in law. For this work a large staff of professors and lecturers will be appointed, chosen in part from the present teaching staff of the university and in part from others with special fitness for work of this kind. The whole undertaking will be under the supervision of Prof. James Chidester Egbert, who, as director of the summer session, has brought that branch of the university's activity to a high degree of excellence. Professor Egbert will also serve as director of extension teaching.

Texas Iron Ore Developments.

AUSTIN, TEXAS, February 9, 1910.—Representatives of the traffic department of the Santa Fe Railroad recently conferred with the State Railroad Commission in regard to the proposed reduction of the rate on iron ore from east Texas points to Gulf ports. It developed in the course of this conference that Charles M. Schwab and associates, who purchased iron ore lands in Camp and Morris counties a short time ago, are proceeding rapidly with their preliminary work for mining and shipping ore. Extensive tests have been conducted upon the lands with the view of determining the extent of the ore deposit. The results show that there are approximately 90,000,000 tons of ore available and that no unusual difficulties are to be met with in the mining operations. Exhaustive tests have also been made of the ore and it is found to be of an unusually high grade, according to the authoritative statements made to the railroad commission.

The ore is to be shipped to the plant of the Bethlehem Steel Company in Pennsylvania, and a tentative contract for the transportation of a certain stipulated tonnage per annum from the mines to the Gulf port Bolivar, opposite Galveston, was entered into by Mr. Schwab and associates and the Santa Fe. The closing of this contract depended upon the attitude of the railroad commission toward the proposed heavy movement of freight. The Santa Fe made application for a low rate on the ore and it was granted by the commission. Then the question arose on the part of the road as to whether the commission might not make the low rate that had been authorized on the transportation of this iron ore as a basis for reducing the rates on other articles and commodities. It was for the purpose of satisfying themselves upon this point that the traffic representatives of the road recently held another conference with the members of the commission. They were assured by the latter that the low rate on iron ore was for the purpose of bringing about the development of that important resource, and that it would not be used as a basis for reducing other rates.

The Santa Fe has therefore closed its contract with Mr. Schwab and associates for the movement of the ore and the shipments will begin as soon as the mines can be opened and given a railroad outlet. To reach the ore fields the Santa Fe will immediately build a branch line from Longview to the lands where the ore is to be mined. This line will be about 50 miles long. The survey is now being made and the contract for its construction will soon be let.

The Santa Fe has constructed extensive terminals and port facilities at Bolivar. It is already making that subport the deep water outlet for the big lumber traffic over its line destined for export. The haul from the ore field to Bolivar is about 300 miles, but it is a low grade line all the way. H.

The Fort Pitt Steel Casting Company, McKeesport, Pa., making a specialty of small steel castings, is erecting a steel addition to its foundry building, which, when completed, will give it an immediate increase, and in addition allow some space for future growth. The company is busy, having considerable business booked for manufacturers, railroads, &c., and the prospects for more work are excellent.

The Iron and Metal Trades

Lower Prices for Pig Iron.

Resale Southern Iron Pressing on the Market.

Some published statements from railroad sources in the past week have indicated that the continued hesitation and doubt have had their effect on current business. In the iron trade there is thus far no evidence of cancellation of orders, nor, except as railroad blockades have been responsible for delays, has there been any appreciable holding back of shipments. Not in many years have snows and severe cold interfered so seriously with transportation. This and the slowing of the buying pace that was so rampant four months ago are temporary causes. Leaders in the iron trade, sifting these from more lasting influences that in some quarters are considered to be at work, are less disposed to attach serious import to the latter, finding indications that with the coming of spring a good buying movement will again set in.

On finished materials specifications continue large and new orders in most finished lines, while less than current shipments, are of fair volume. Deliveries are improving on nearly all rolled materials.

The halt in buying is most pronounced in foundry pig iron, and in some markets considerably lower prices are reported. At Cincinnati one interest has bought 2500 tons of Southern iron at prices ranging from $12, at furnace, for gray forge, to $13 for No. 2 and No. 2 soft, and one block of 7000 tons speculative iron is being offered at low figures. Holders of Southern certificate iron have also made attractive offers in the Chicago district, the iron being in all cases for immediate shipment. Furnace companies are not known to have quoted below $13.50, at Birmingham, for first quarter, and $14 for second half of the year is minimum with most of them.

The United States Steel Corporation has bought 40,000 tons of Bessemer iron from furnaces in the Mahoning and Shenango valleys at $18, at furnace, for delivery in March, April and May. It is expected that some of the independent steel companies will be buyers of Bessemer iron for the second half of the year. Low phosphorus irons have been offered at some Pennsylvania furnaces at $1 a ton below early January prices.

In the Chicago district premiums for forging billets have disappeared. Pittsburgh reports that rerolling billets are still scarce for early delivery.

Implement manufacturers in the West are feeling the market for steel bars for next season, but the mills will be fully occupied on old bar contracts until July 1 and are not in haste to discuss next year's business.

Some of the Western roads have considerable additional purchases of equipment in hand. Rolling stock in that section has suffered under the hard service of the winter. The Rock Island has placed an order for 75 locomotives.

The wire trade is more active than some recent reports have indicated. The leading interest sent more specifications to its mills in January than they were able to handle, owing to railroad congestion. This month its shipments and new sales have about balanced at the rate of 5400 tons a day. The reported shading of wire prices seems to be confined to smaller mills or to jobbers seeking to reduce large stocks.

In the plate market the largest inquiry is for 10,000 tons, to be used in a riveted steel pipe line for Portland, Ore., water supply.

Detroit has bought 4300 tons of cast iron pipe and Duluth 2000 tons. Cleveland will open bids for 3400 tons February 21 and a Chicago purchase is pending. Some good inquiries from private water and gas companies are in the market.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Feb. 16, 1910.	Feb. 9, 1910.	Jan. 19, 1910.	Feb. 17, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	*$18.75*	$18.75	$19.00	$17.00
Foundry No. 2, Southern, Cincinnati	*17.00*	17.25	17.25	16.25
Foundry No. 2, local, Chicago	19.00	19.00	19.00	16.50
Basic, delivered, eastern Penn.	*18.50*	18.50	18.75	16.75
Basic, Valley furnace	*16.35*	16.50	17.00	15.00
Bessemer, Pittsburgh	*18.90*	19.65	19.90	16.90
Gray forge, Pittsburgh	*16.90*	17.15	17.40	15.15
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	27.50	27.50	27.50	25.00
Forging billets, Pittsburgh	**32.00**	32.00	31.00	27.00
Open hearth billets, Philadelphia	30.60	30.60	30.60	26.20
Wire rods, Pittsburgh	33.00	33.00	33.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	*16.50*	16.50	17.00	14.50
Steel rails, melting, Philadelphia	*16.50*	16.50	17.00	15.50
Iron rails, Chicago	*19.00*	19.00	20.00	18.25
Iron rails, Philadelphia	*20.00*	20.00	20.50	19.00
Car wheels, Chicago	*17.50*	18.00	18.50	15.25
Car wheels, Philadelphia	*16.75*	16.75	17.50	15.50
Heavy steel scrap, Pittsburgh	*17.25*	17.50	17.50	15.50
Heavy steel scrap, Chicago	*15.25*	15.50	16.00	13.50
Heavy steel scrap, Philadelphia	*16.50*	16.50	17.00	15.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	1.60	1.60	1.60	1.47
Common iron bars, Chicago	1.60	1.60	1.60	1.50
Common iron bars, Pittsburgh	1.70	1.70	1.70	1.50
Steel bars, tidewater, New York	1.66	1.66	1.66	1.56
Steel bars, Pittsburgh	1.50	1.50	1.50	1.40
Tank plates, tidewater, New York	1.71	1.71	1.71	1.76
Tank plates, Pittsburgh	1.55	1.55	1.55	1.60
Beams, tidewater, New York	*1.66*	1.66	1.71	1.76
Beams, Pittsburgh	*1.50*	1.50	1.55	1.60
Angles, tidewater, New York	*1.66*	1.66	1.71	1.76
Angles, Pittsburgh	*1.50*	1.50	1.55	1.60
Skelp, grooved steel, Pittsburgh	1.50	1.50	1.50	1.45
Skelp, sheared steel, Pittsburgh	1.60	1.60	1.60	1.50
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh*	1.85	1.85	1.85	1.95
Cut nails, Pittsburgh	*1.80*	1.80	1.85	1.75
Barb wire, galv., Pittsburgh*	2.15	2.15	2.15	2.40
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	*13.75*	13.75	14.00	13.50
Electrolytic copper, New York	*13.50*	13.50	13.75	13.12½
Spelter, New York	*5.60*	6.12½	6.25	4.92½
Spelter, St. Louis	*5.45*	5.87½	6.10	4.80
Lead, New York	*4.55*	4.70	4.70	4.05
Lead, St. Louis	*4.40*	4.55	4.60	3.90
Tin, New York	**33.20**	32.60	32.75	28.80
Antimony, Hallett, New York	8.25	8.25	8.25	8.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.89

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.; New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.50c. to 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February

6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in	70	54	65	..
⅜ in	71	57	66	52
½ in	74	62	69	57
¾ to 6 in	78	68	73	63
7 to 12 in	72	57	67	52
Plugged and Reamed.				
1 to 4 in	76	66	71	61
Extra Strong, Plain Ends.				
⅛ to ⅜ in	63	51	58	46
½ to 4 in	70	58	65	53
4½ to 8 in	66	54	61	49
9, 10, 11 and 12 in	54	42	..	..
Double Extra Strong, Plain Ends.				
½ to 8 in	59	48	54	43

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in	49	43
1¾ to 2¼ in	61	43
2½ in	63	48
2¾ to 5 in	69	55
6 to 13 in	61	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $33.

Steel Rivets.—Structural rivets, 2.15c., base; boiler rivets, 2.25c., base, subject to usual extras.

Pittsburgh.

PARK BUILDING, February 16, 1910.—(*By Telegraph.*)

Pig Iron.—The present weakness in prices of pig iron is clearly shown when an actual inquiry comes in the market. The Standard Sanitary Mfg. Company has bought for its Louisville, Ky., works, for March and April delivery, 1250 tons of Southern No. 2 foundry and No. 2 soft at $13; 500 tons of No. 3 at $12.50, and 750 tons of forge at $12, all f.o.b. Birmingham. Hardly enough Northern iron is being sold to fix a market. We quote Bessemer pig iron at $18; basic at $16.25 to $16.50; malleable Bessemer, $17; No. 2 foundry, $16.50, and gray forge, $16, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Steel.—Fancy prices are being paid for small lots of billets, sheet and tin bars and small billets rolled from open hearth stock. All the makers of open hearth steel are still much behind in deliveries, and this is shown by the fact that frequent inquiries come in the market for small lots of billets and bars for prompt delivery. The supply of Bessemer soft steel seems to be a little better and prices are lower than for open hearth. We quote 4 x 4 in. Bessemer billets at $27.50 to $28, and Bessemer sheet and tin bars, $28.50 to $29. We quote 4 x 4 in. open hearth billets at $29 to $29.50; small billets, $30 to $31; sheet and tin bars, $29 to $29.50, and forging billets, $32 to $33, f.o.b. maker's mill. We note a sale of 200 tons of open hearth sheet bars for prompt shipment at $29, maker's mill.

(*By Mail.*)

The event of the week was the purchase of 40,000 tons of Bessemer pig iron by the United States Steel Corporation at $18, Valley furnace, for delivery in March, April, May and June, of which the Bessemer Pig Iron Association took 25,000 tons and W. P. Snyder & Co. 15,000 tons. This purchase puts the price of Bessemer at $18, which is about 50 cents a ton lower than the nominal market has been for several months. The Bessemer Pig Iron Association has received several inquiries from other large users for iron for delivery over the last half of the year, and it is not improbable that it may sell additional iron in the near future. It is the consensus of opinion of users of Bessemer iron, and also of some of the more conservative furnace interests, that its price never should have been allowed to go above $18, at furnace. What effect this sale will have on the general market remains to be seen. The output of pig iron by the steel companies is heavy. The Jones & Laughlin Steel Company started No. 2 furnace at Aliquippa Monday, and the two stacks now running there will soon give this company an output of 1000 tons per day of Bessemer, all of which is being sent to its mills in Pittsburgh. It is not likely that it will buy iron in the open market for some time at least. The Youngstown Sheet & Tube Company has another furnace coming on at Youngstown, and will soon be in shape to take care of itself in pig iron. The fact that the Steel Corporation bought only 40,000 tons, and deliveries are spread over four months, indicates that it was not in very urgent need of iron, or it would have bought a larger tonnage. The Bessemer Pig Iron Association has agreed to furnish more Bessemer iron to the Steel Corporation at the same price, and for the same deliveries, if it should want the iron, but no actual option has been given. The general market is hesitating, and, as one steel interest puts it, is just "marking time." The unsettled conditions at Washington are held responsible for the halt in the steel business, and how long it will continue and how far it will go are the uppermost questions in the trade. There is no incentive for consumers to buy ahead, and caution will be evident until the situation at Washington clears. Prompter deliveries are being made by the mills, but on some products, such as open hearth billets and bars, plates, structural shapes, merchant bars, sheets and tin plate, are still much behind. There is enough work on their books to tide them pretty well over the first half unless cancellations should start, and these are not in evidence as yet. There is not likely to be any material change for the better in the near future, but there is still the belief that the present lull will disappear quickly when conditions at Washington have cleared up and that 1910 will be a good year. The weakness in pig iron is reflected in scrap, which is in slight demand with prices soft. Coke is almost neglected, and a movement has started to cut down the output. The wire trade is fairly active, with indications of heavier business as soon as spring trade starts. The severe winter and the frozen up condition of much of the country, particularly the farming districts, have had their effect in curtailing demand. A couple of weeks of warm weather and sunshine would help things very much.

Ferromanganese.—There is practically no new inquiry, consumers being pretty well covered, and prices are rather easy. We quote 80 per cent. foreign at $43.50, Baltimore, with a freight rate of $2.30 for delivery in the Pittsburgh district. For delivery over last half of the year $45, seaboard, is quoted, but consumers do not seem to be interested. The general uncertain conditions existing are construed by consumers to mean that there is no hurry to cover for late in the year delivery.

Ferrosilicon.—Local consumers are pretty well covered for some little time ahead, but a sale is reported of 200 tons of 50 per cent. for delivery to a consumer outside the Pittsburgh district, at a price equal to about $62, Pittsburgh. Prices are fairly strong, and we quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $62 to $62.50, Pittsburgh, for prompt shipment.

Muck Bar.—There is little new inquiry and the sagging off in prices of pig iron, gray forge having declined about 50 cents a ton, is reflected in the price of muck bar, which is not quite as strong as it was. We continue to quote best grades of muck bar in long lengths, and made from all pig iron, at $30, Pittsburgh, but on a firm offer for considerable tonnage, it is not improbable that this price might be shaded.

Rods.—Not much new buying is being done, most con-

sumers being covered up to July 1 on contracts made late last year and at prices somewhat lower than are ruling now. Specifications against these contracts are coming in nicely, and shipments by the mills are fairly heavy. We continue to quote Bessemer, chain and open hearth rods at $33 to $34, the higher price being for small lots for prompt shipments.

Skelp.—Some anxiety is being shown by the mills to book orders than for some time, this indicating that business taken some time ago has been pretty well cleaned up. Prices are fairly firm, and we quote grooved steel skelp, 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.75c. to 1.80c., and sheared iron skelp, 1.90c., all for ordinary width and gauges, f.o.b. Pittsburgh.

Steel Rails.—Last week the Carnegie Steel Company entered new orders for 3145 tons of light rails and received specifications against contracts for 415 tons, but entered no new orders of any magnitude for standard sections. Small orders for standard sections ranging from 300 tons up to 1000 tons are being placed right along. We quote steel axles at 1.75c. to 1.80c. and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—The biggest inquiry in the market is for about 10,000 tons of plates for 48 in. riveted steel pipe for a water supply for the city of Portland, Ore. The order is likely to come to a local mill. Deliveries will be strung along for a considerable time. Some orders for steel cars have been placed, the largest of these being that of the Norfok & Western Railroad, which ordered 500 stock cars and 1500 gondolas from the American Car & Foundry Company and 500 gondolas from the Pressed Steel Car Company. The Wabash-Pittsburgh Terminal Railroad is in the market for 500 steel hoppers; Missouri, Kansas & Texas for 1000 box cars, 300 furniture cars, 200 automobile cars, 500 gondolas and 100 flat cars, all to have steel underframes; National Railroad of Mexico for 300 box cars, 50 stock cars, 200 wood and steel gondolas and 50 combination flat cars; Missouri, Jackson & Kansas City Railroad for 100 box cars and 300 flat cars, and the Mexico & Northwestern for 60 stock cars and 200 box cars. The plate mills are comfortably filled with orders for the next three or four months, and the current demand from boiler makers and other consumers is keeping up fairly well. The market is firm, and we quote ¼-in. and heavier plates at 1.55c. in large lots and 1.60c. to 1.65c. in small lots for prompt shipment.

Structural Material.—The situation is rather quiet, and competition for desirable work is keener than for some time. The McClintic-Marshall Construction Company has taken 600 tons for a new foundry building for the Reading Iron Company, Reading, Pa., and 500 tons for steel buildings to be erected in an Eastern city. The American Bridge Company has taken several good sized orders for bridges, and there is considerable inquiry for bridge work. We quote beams and channels up to 15-in. at 1.50c. minimum for desirable tonnage, and 1.55c. to 1.60c. on general current orders.

Tin Plate.—While there is not a great amount of new buying, the leading consumers, such as the canners and meat packers, placed heavy contracts some time ago and are now specifying against them. The mills are well filled up for the next three or four months, and shipments are heavy. Prices are firm and we continue to quote 100 lb. cokes at $3.60 per base box, f.o.b. Pittsburgh, for delivery up to July 1.

Sheets.—While the new demand is not as active as it was in the last two or three months of 1909, the mills are entering a good many new orders and are well filled up with contracts running up to July 1, against which buyers are specifying freely. We note a continued scarcity in electrical and blue annealed sheets, and for prompt delivery these two grades of sheets continue to command $1, and in some cases $2 a ton over regular prices. The market is firm and we quote: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at $1.70 per square for painted and $3 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

Bars.—Specifications on steel bars are being received by the mills in heavy volume from the wagon builders and implement makers and shipments by the mills are as heavy at this time as in any period in the last six months. The mills rolling iron bars are also receiving liberal specifications, but the new demand for both iron and steel bars has quieted down to some extent, largely for the reason that consumers are well covered. On contracts for delivery through first and second quarters several of the leading steel bar mills are naming 1.45c., at mill, but for prompt shipment 1.50c. to 1.55c. is being quoted. Iron bars are held at about 1.70c., Pittsburgh.

Hoops and Bands.—The new demand is fairly heavy, while specifications against contracts continue to come in quite freely. We quote steel hoops for forward delivery at 1.50c. to 1.60c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are 1.45c. to 1.50c., on contracts, and from 1.60c. to 1.65c. for prompt shipment.

Spelter.—The market continues weak and prime grades of Western are still being offered at 5.65c. to 5.70c., East St. Louis, the freight rate to the Pittsburgh District being 12½c. per 100 lb.

Spikes.—Few orders are being received from the railroads. Specifications against contracts placed last year are coming in freely and the spike makers are pretty well filled up for the next two or three months. We quote standard sizes of railroad spikes, 4½ x 9-16 and larger, at $1.70 for Western shipment and $1.75 for local trade. Boat spikes are firm at $1.75, base, and small railroad spikes at $1.75, base. These prices are for carload and larger lots.

Shafting.—Buying continues liberal and specifications against contracts are also coming in quite freely. We are advised that discounts are being firmly maintained, these being 55 per cent. off in carloads and 50 per cent. in less than carloads delivered in base territory.

Rivets.—There is a fair amount of new buying and specifications against contracts are being steadily received, so that the rivet makers are pretty comfortably filled with business and running to practically full capacity. Prices are firm but unchanged and we quote: Structural rivets, ¾-in. and larger, 2.15c., base; cone head boiler rivets, ¾-in. and larger, 2.25c., base; ⅝-in. and 11-16-in. take an advance of 15c., and ½-in. and 9-16-in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

Wire Products.—The new demand for wire nails and wire products generally is quiet, spring trade not having opened up yet, and owing to the heavy snows and frozen condition of the ground nothing is being done by the farmers in the way of building fences. There are reports that prices of wire products are being shaded, but this is denied by the two leading interests, and if any shading is being done it is likely by small mills, or by the jobbers who have heavy stocks which they desire to reduce. We quote wire nails at $1.85 in carload and larger lots; painted barb wire, $1.85; galvanized, $2.15; annealed fence wire, $1.65; galvanized, $1.95, and cut nails, $1.80, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

Merchant Pipe.—It is believed that the order of the Arkansas Natural Gas Company for about 200 miles of line pipe, which has been in the market for some time, will be placed in the near future, as the company is understood to have satisfactorily arranged its finances. Heavy specifying is being done against contracts, and, while the new demand for pipe is about as large as it usually is at this season of the year, this being always the dull period in the pipe trade. All the leading pipe mills are pretty well filled with orders for the next several months. It is stated that discounts on pipe, as printed elsewhere in this issue, are being firmly held.

Boiler Tubes.—The railroads and locomotive builders are placing fair sized orders for locomotive tubes, while the new demand for merchant tubes is also as large as usual at this season. It is stated that discounts on tubes are being firmly held.

Coke.—There is evidently a large surplus in the supply of coke, which has brought about some demoralization in prices, and a movement is now under way to cut down the output materially. Some of the coke plants in the Connellsville region are now running only four days a week and the output will be further restricted unless the demand soon improves. There is some talk of establishing a central selling agency to handle the output of a large number of the producers, but some in the trade believe that such a plan is not feasible. The production of coke last week was about 470,000 net tons, a falling off of about 15,000 tons as compared with the previous week. Standard makes of furnace coke for prompt shipment are being offered as low as $1.75 and foundry coke at $2.50 per net ton, at oven, or lower. There is no demand for either furnace or foundry coke on contracts, consumers being covered.

Iron and Steel Scrap.—The awards of scrap on the Eastern lines of the Pennsylvania Railroad were made February 14, but information has not reached here as to the prices paid. The general scrap trade continues quiet, most consumers being covered for some little time ahead and can see no incentive in present conditions to anticipate their requirements. The Monessen interest is about the only consumer of heavy steel scrap that has been buying to any extent for some time, while the leading local consumer of borings and turnings is out of the market, and these two grades are neglected. The easing off in prices of pig iron is reflected in iron scrap, prices being soft. A better buying

movement is not looked for until general conditions improve, as consumers believe that by holding off they may be able to buy at lower prices when they are in actual need of the material. There have been no important sales in this district in the past week, but several producers report that an Eastern consumer has been buying quite heavily in this market for the past two or three weeks, having contracted for some 5000 to 6000 tons of heavy steel scrap and other grades. Dealers quote about as follows, per gross ton, for delivery at Pittsburgh or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh	$17.25
No. 1 foundry cast	$16.50 to 16.75
No. 2 foundry cast	15.50 to 15.75
Bundled sheet scrap, at point of shipment	15.00 to 15.25
Rerolling rails, Newark and Columbus, Ohio, and Cumberland, Md.	18.00 to 18.25
No. 1 railroad malleable scrap	16.00 to 16.25
Grate bars	12.50 to 12.75
Low phosphorus melting stock	21.00
Iron car axles	26.50 to 27.00
Steel car axles	21.00 to 21.25
Locomotive axles	27.75 to 28.00
No. 1 busheling scrap	15.25 to 15.50
No. 2 busheling scrap	11.75 to 12.00
Old car wheels	17.00 to 17.25
Sheet bar, crop ends	18.25 to 18.50
Cast iron borings	10.25 to 10.50
Machine shop turnings	12.25 to 12.50

Chicago.

FISHER BUILDING, February 16, 1910.—(*By Telegraph.*)

General business conditions in the West are more favorable this week, and there are indications that the period of dullness in the iron and steel industry, which has been called uncertainty for several weeks, will soon be a thing of the past. The railroads are coming back into the market. Apparently the embargo on their purchasing departments was not so extensive as some of its advocates had hoped and believed. While it has proved embarrassing to supply houses and some of the smaller manufacturers of equipment, it was more extensive on paper than in actual reality. It is understood from official sources that the leading Western roads have plans under way or near the contract point for large expenditures for locomotives, cars, bridge work and machine shop equipment to supplement the extensive orders they have already given for rails and track supplies. The Rock Island has just ordered 75 locomotives, the Great Northern and Burlington have large machine tool lists in the market, and other extensive purchases by Western roads will be announced in the near future, including a large amount of structural material for bridge work and track elevation. Some of this business has been held in abeyance on account of financial and legislative conditions, and the further fact that the Northwestern roads have had heavy expenses and restricted earnings during the snow blockades of December and January. The general run of new business at the steel mills is light, but this is not seriously considered as a market condition. It is the off season for contracting in bars and other important finished products. The sales departments ate their cake last fall by selling all that they can deliver until next June or July, and they welcome a cessation in new buying which will give them an opportunity to get deliveries better in hand. Industrial buyers have had to go to the jobbers and pay full prices recently for a surprisingly large amount of odds and ends of material which the mills have been unable to deliver. There is a remarkable run of business in small structural orders, and more of the large projects which have been pending are being closed than during January. Altogether conditions are sound in finished products, and it would take a long siege of agitation or dullness to make any impression on the Western market.

Pig Iron.—The expected buying movement in foundry iron has not yet appeared and the trade has been very quiet the past week. There are scattering inquiries for both Southern and Northern iron and there are indications that the larger buyers are watching the market closely, but there has been a good deal of discouraging talk in business circles recently, and this has had the effect of postponing any actual buying movement. The foundries and manufacturing industries are all full of business, with the exception of car wheel foundries and some of the equipment industries. The malleable foundries have bought liberally for their requirements for the last half, and there is still some business pending in malleable Bessemer. The lower grades of Southern iron are holding firm, and $14, Birmingham, is believed to be the best that can be done on No. 2 foundry for any deferred delivery. There are indications, however, that the holders of certificate iron are becoming impatient after the dull market which they have passed through for three months, and spot iron is now offered rather freely at $13.50, Birmingham, if the buyer is not particular in specifying the brand. Some of the furnaces are apparently willing to ship from their stocks at the same price on spot orders. This makes a spread of nearly $1.50 per ton in the Chicago market between the quotation for Southern spot iron and current prices for No. 2 Northern, but it is understood that the Northern furnaces, which have heretofore quoted $19, at furnace, the buyer to pay switching charges, are now willing to sell at $19, delivered in the Chicago District. The iron men, however, express confidence in the future, and one leading Southern interest, which ought to have exceptional facilities for forecasting the market, continues to stand pat at $15. The following quotations are for February and March delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	19.50 to 20.00
Northern coke foundry, No. 2	19.00 to 19.50
Northern coke foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	19.00 to 19.50
Southern coke, No. 1	18.85 to 19.35
Southern coke, No. 2	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.60 to 18.10
Southern coke, No. 1 soft	18.85 to 19.35
Southern coke, No. 2 soft	18.35 to 18.85
Southern gray forge	17.35 to 17.85
Southern mottled	17.10 to 17.60
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 8%	22.40 to 22.90
Jackson Co. and Kentucky silvery, 10%	23.40 to 23.90

(*By Mail.*)

Billets.—Not so much complaint is heard among buyers of difficulty in obtaining forging billets. Eastern mills are apparently able to supply the demand for Bessemer billets, and while the supply of open hearth forging billets is not so plentiful, it is no longer necessary to pay premiums over the regular market price.

Rails and Track Supplies.—Orders for standard rails amounted to about 12,000 tons last week, with the usual run of business on light sections. The railroads continue to give heavy specifications for track supplies. We quote standard railroad spikes at 1.85c. to 1.95c., base; track bolts and square nuts, 2.40c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $27; 30 to 35 lb., $27.75; 16, 20 and 25 lb., $28; 12 lb., $29, Chicago.

Structural Material.—The structural mills and fabricators would be overwhelmed with business if all the projects that are in prospect would materialize in the near future in actual contracts. Many large projects have been held up since the first of the year by the unwillingness of the parties financing the deals to pay the advanced prices for material, and other projects are delayed by the decline in the stock market and the uncertainty which investors feel regarding the future, while railroad business is light for other reasons. In the face of these discouraging factors in the market new business is coming forward in a very satisfactory manner. The Northern Pacific has given the American Bridge Company the contract for a lift bridge amounting to 440 tons, and the latter company also booked 1200 tons of car axles. The American National Bank at Austin, Texas, 1200 tons, has been let to the Chesapeake Iron Works, Baltimore, which will use Bethlehem shapes. The People's Bank at Sacramento, Cal., 350 tons, was let to Milliken Brothers. The Mathers Hotel, Denver, Colo., 200 tons, was let to the Queen City Iron Works of that city. There is an active demand for small lots of structural, much of which is bought from store. We quote plain material from mill, 1.78c. to 1.88c., Chicago; from store, 2c., Chicago.

Plates.—The tank and boiler shops are furnishing a fair volume of new business, most of which is going to Eastern mills, and there is also a good demand for universal plates. On car shop material the Western mills have specifications which will carry them several months. We quote mill prices at 1.78c. to 1.88c., Chicago; store prices, 2c., Chicago.

Sheets.—There is more new business in sheets than in other lines of finished products, as the jobbers and industrial buyers are very steady customers of the sheet mills and have difficulty in getting deliveries of blue annealed sheets to cover their requirements. We quote as follows, Chicago: No. 10 blue annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are; No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—The railroads are specifying freely on their old contracts for bar iron, as well as for track supplies and other bar products. Manufacturers and other industrial buyers who generally get all their material from the mills are going to jobbers and paying full store prices for odds and ends, which they are unable to get in time for spring trade on their specifications with the mills. Old steel rails are one of the few items in the old material list on which prices have not declined recently in the scrap market, this fact throwing light on the demand for hard steel bars, which is active, coming chiefly from the implement manufacturers and contractors for concrete work. Many of the implement manufacturers are feeling the market regarding prices for the year beginning July 1, but the mills have not yet given this subject serious consideration. They have all the trouble they want in making deliveries on specifications given last fall and are not able to satisfy their customers. Many of the mills, in fact, have specifications that will keep them

busy until July. Under these conditions the volume of new business coming forward is not of much interest, but it may be noted that the railroads are not placing any new orders, and many of the repair shops and equipment plants are closed down. There is, however, a little new business coming forward from miscellaneous sources, although this is the off season for placing bar contracts. Subject to the usual delay in delivery of soft steel bars, we quote as follows: Soft steel bars, 1.68c. to 1.78c.; bar iron, 1.60c. to 1.65c.; hard steel bars rolled from old rails, 1.60c. to 1.65c., all Chicago.

Rods and Wire.—Manufacturing consumers of rods and wire continue to have difficulty in obtaining sufficient material for their needs, but in the jobbing trade it is understood that weakness has developed in some cases, owing to the fact that jobbers are overstocked. It is believed that they are making a sacrifice in offering wire products at any concession, as it is generally understood that prices will be higher in the near future. We quote Bessemer, open hearth and chain rods at $36, Chicago. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—November, December and January proved the largest months in the history of mills which sell merchant and agricultural steel in this territory. Buyers of agricultural steel have exhausted all sources of supply and will not be able to get all they could use in manufacturing goods for their spring trade. Manufacturers of machinery and machine tools find that in many lines the principal delay in completing orders they have taken grows out of the difficulty in getting machinery steel. This, in fact, is one of the branches of the steel industry in which the steel men could not foresee the remarkable expansion in the demand in time to enlarge their facilities.

Cast Iron Pipe.—The Detroit letting of 4300 tons of water pipe last week went to a local plant of the American Car & Foundry Company. At Duluth, Minn., a contract for 2000 tons was let to the United States Cast Iron Pipe & Foundry Company. The Chicago business is still pending. There are good inquiries for gas pipe and a fair volume of municipal business is also in prospect to be let within the next few weeks. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Old Material.—The decline in the stock market, political agitation and the fact that many railroads are not placing new business for equipment have created conditions that have backed up into the scrap market and caused a general softening in prices. Only a few lines have been able to withstand the general bearish tendency. Rerolling rails continue strong, as many of the dealers have contracts with the mills rolling hard steel bars on which deliveries have not yet been completed. Locomotive tires continue in fair demand and relaying rails are scarce. Agricultural malleable is easily placed with consumers, although railroad malleable is lower. Steel scrap is lower and difficult to place with the mills and wrought scrap is also weak. The rolling mills bought heavily last fall to cover their railroad contracts and other bar business and will not become active purchasers of scrap until the bar iron market becomes more active. The general tone of the scrap market reflects in perhaps an exaggerated degree the temporary reaction or cessation of new buying in the iron and steel market. Old car wheels are quoted lower and dealers find them difficult to sell, as the car wheel foundries generally have large stocks of material and complain of a dearth of new business for their product. The following prices are per gross ton, delivered, Chicago:

Old iron rails	$19.00 to $19.50
Old steel rails, rerolling	18.00 to 18.50
Old steel rails, less than 3 ft.	16.50 to 17.00
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	17.50 to 18.00
Heavy melting steel scrap	15.25 to 15.75
Frogs, switches and guards, cut apart	15.25 to 15.75
Shoveling steel	14.75 to 15.25

The following quotations are per net ton:

Iron angles and splice bars	$17.00 to $17.50
Iron car axles	21.00 to 22.00
Steel car axles	21.00 to 22.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	13.50 to 14.00
Springs, knuckles and couplers	14.50 to 15.00
Locomotive tires, smooth	19.00 to 19.50
No. 1 dealers' forge	12.50 to 13.00
Steel axle turnings	11.00 to 11.50
Machine shop turnings	10.00 to 10.50
Cast and mixed borings	7.00 to 7.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	14.50 to 15.00
Stove plate and light cast scrap	12.50 to 13.00
Railroad malleable	14.50 to 15.00
Agricultural malleable	13.00 to 13.50
Pipes and flues	11.50 to 12.00

Metals.—Spelter continues in a very unsettled condition and it is difficult to quote a price one day that would apply the next, as there has been a continuous decline for several weeks; 5.70c. is believed to be the best that can be done by the ordinary carload buyer for Chicago delivery. The demand for copper and other metals is relatively light, lead being quoted a little lower and tin a little higher. We quote Chicago prices as follows: Casting copper, 13¾c.; lake, 14⅛c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33¾c.; small lots, 35c.; lead, desilverized, 4.60c. to 4.70c., for 50-ton lots; corroding, 4.85c. to 4.95c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.70c. to 5.80c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¾c.; copper bottoms, 12c.; copper clips, 13½c.; red brass, 12¾c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

Philadelphia.

PHILADELPHIA, PA., February 15, 1910.

The market continues dull in nearly all branches. Manufacturers and consumers are alike pursuing a waiting policy. While sales have been comparatively light and almost wholly represent requirements of purchasers for the immediate and near future, there has been no softening of prices. The undertone of the market can hardly be termed strong, but there is a decided hesitancy shown by purchasers of nearly all classes of material. Billets and sheets probably show more movement than any other line. Plates and shapes have been quiet, but some good business is in sight. Bars are dull. Coke continues easy. Old materials are inactive, with prices showing a downward tendency. Weather conditions still interfere with outside work, while legislative matters are having an unfavorable effect on general business.

Pig Iron.—Little movement in any grade is to be noted, hesitancy being still strongly apparent on the part of consumers who have been in the market for forward deliveries. The demand for prompt iron is less active, buyers having pretty generally covered for their early requirements. The principal sellers are comparatively well fixed as far as iron for first, and, in some cases, second quarter delivery is concerned and therefore have little tonnage to offer. The principal movement continues to be in Virginia foundry irons, in which quite a fair volume of business has been done for first half shipment at $18.50, delivered, for No. 2 X foundry, and $18 for No. 2 plain, the stove interests being particularly in evidence as buyers. Sales have been usually in small lots, but one or two large blocks have been sold for New England shipment at the same base price, which continues at $15.50, furnace, for No. 2 X. One sale of several thousand tons of pipe making iron, for local consumption, has also been reported by a Virginia maker. Sales of Northern foundry grades have been particularly light. With higher costs facing many of these producers, the tendency to meet the lower prices of the majority of the Virginia makers is not pronounced, and while $18.75, delivered, may be done for some brands for early shipment, no heavy tonnage is available at that figure. Deliveries on contracts are reported as being taken freely, and in some cases producers are falling behind on their usual shipments, owing principally to the unsatisfactory working of some furnaces. Stocks on banks are understood to be showing a slight increase in some specific instances, but the volume so far has been so small that it is not to be considered a factor. The pipe interests are still in the market for low grade irons. No movement in Southern iron is noted. A trifle better inquiry for forge iron is reported, although no sales have been announced; $17.50 to $17.75, delivered, is the usual range of quotations for this grade. The steel making grades have been inactive; an unconfirmed rumor of a sale of 2500 tons of basic for early delivery is reported, but few buyers, however, are in the market for first half iron, and there is still a tendency to hold off as far as considering business for third quarter is concerned. Less demand for low phosphorus iron prevails, sellers of this grade now being pretty well sold up for the first half and not actively seeking business. Prices, on the whole, are unchanged and we can learn of no concession from recent quotations or any urgency to place or take business for second half shipment. The following range of quotations is named for deliveries in buyers' yards in this vicinity during the remainder of the first half of the year:

Eastern Pennsylvania, No. 2 X foundry	$18.75 to $19.00
Eastern Pennsylvania, No. 2 plain	18.25 to 18.50
Virginia, No. 2 X foundry	18.50
Virginia, No. 2 plain	18.00
Gray forge	17.50 to 17.75
Basic	18.50 to 18.75
Low phosphorus	22.75 to 23.25

Ferromanganese.—The demand continues extremely light, with only an occasional inquiry for a small lot. Prices are largely nominal, ranging from about $43.50 to $44.50, Baltimore, dependent on tonnage and delivery.

Billets.—There is still an active demand for billets, but Eastern makers have comparatively little to offer for first half shipment. Western inquiries are still being received and some moderate orders have been taken. Specifications on contracts come out freely and some consumers are urging deliveries. Prices are well maintained. Ordinary open hearth rolling billets for reasonable shipment are quoted at $30.60, delivered in this vicinity. Forging billets are in active demand and are firm at $33 to $36, Eastern mill, dependent on specifications. For prompt shipment both rolling and forging billets are scarce and usually command a premium.

Plates.—Current business has been of a miscellaneous character, principally small orders for early shipment; specifications on contracts, however, are being freely received. While the immediate demand is quiet, there is some business requiring large quantities of plates under negotiation, and the trade looks for increased activity in the near future. While reports of price concessions are occasionally heard, Eastern mills are apparently firmly maintaining prices at 1.75c. to 1.80c. for ordinary plates delivered in this territory.

Structural Material.—The business placed during the week has not been heavy; mills, however, are fairly well supplied with specifications and are actively engaged. A number of small buildings have been taken by fabricators and several propositions of fair size are under negotiation. Prices are being firmly maintained by Eastern producers, 1.75c. to 1.80c. being quoted for plain shapes, delivered in this vicinity.

Sheets.—A lively demand is reported by the leading producers. Orders come out freely and makers find it difficult to meet customers' demands for delivery. The bulk of the business is in moderate sized lots, but the aggregate tonnage booked is large. Prompt shipments command a premium. For reasonable delivery the following range of quotations is named: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—Inquiries are less plentiful and the market has a quieter appearance. Consumers show some hesitancy in placing business, awaiting more settled general conditions. The leading producers maintain quotations for refined iron bars at 1.70c., delivered in this vicinity, although 1.60c. can be done, the smaller makers accepting the latter figure for desirable orders. While steel bar makers are still well supplied with contracts, new orders are less pronounced.

Coke.—Few sales are reported. Consumers have been practically out of the market as far as contract coke is concerned, and what little business has been done has been for prompt or reasonably early delivery. The market is easy, although no further pronounced reductions in prices are noted. Some few sellers hold at $3.25, at oven, for foundry grades, although $2.85 to $3.10 more nearly represents the market. Furnace coke is quoted from $2 to $2.40, at oven, dependent on grade and delivery. The following range of prices is, per net ton, named for deliveries in this vicinity:

Connellsville furnace coke	$4.25 to $4.60
Foundry coke	5.10 to 5.35
Mountain furnace coke	3.85 to 4.20
Foundry coke	4.70 to 4.95

Old Material.—The market could hardly be duller. There has been no movement in steel scrap; embargoes are still in effect at a number of Eastern mills, and where the embargo has been lifted consumers refuse to issue shipping instructions, being, as a rule, well supplied. Deliveries on imported scrap, however, are being freely taken. Rolling mill grades show no life. Prices, while practically unchanged, are largely nominal, not enough business being transacted in most grades to establish quotations. The following range, however, about represents the market for delivery in buyers' yards in this vicinity:

No. 1 steel scrap and crops	$16.50 to $17.00
Old steel rails, rerolling	17.50 to 18.00
Low phosphorus	22.50 to 23.00
Old steel axles	22.50 to 23.50
Old iron axles	27.50 to 28.00
Old iron rails	20.00 to 21.00
Old car wheels	16.75 to 17.25
No. 1 railroad wrought	19.00 to 19.50
Wrought iron pipe	16.25 to 16.75
No. 1 forge fire	15.50 to 16.00
No. 2 light iron	10.25 to 10.75
Wrought turnings	13.25 to 13.75
Cast borings	11.50 to 12.00
Machinery cast	16.00 to 16.50
Railroad malleable	16.00 to 16.50
Grate bars	14.00 to 14.50
Stove plate	13.00 to 13.50

The William Tod Company, Youngstown, Ohio, has received a contract to build a twin tandem compound engine of 44 and 76 x 60 in. for the Republic Iron & Steel Company's new 40-in. blooming mill at Lansingville, Ohio. This will be an exact duplicate of the engine at the Ohio Works of the Carnegie Steel Company at Youngstown.

Cincinnati.

CINCINNATI, OHIO, February 16, 1910.—(*By Telegraph.*)

Although not discernible on the surface to any extent, it is intimated by conservative factors in the iron and steel trade that some history making influences are at work and that the present lull in trade and price softening are but temporary, and not to be taken as a criterion of what to expect the remainder of the year, or even through the first half. In finished lines there is no complaint offered, and jobbing is quite satisfactory, but buyers of pig iron seem absolutely apathetic and are not tempted by offers of 25 to 50-cent concessions. Old material is dull and prices show a decline in almost all grades. The coke market is also weak and concessions for the quick moving of stocks are noted in congested districts.

Pig Iron.—Some more resale iron has appeared, the last offering being a lot of 7000 tons of No. 2 Southern, apparently certificate iron, said to be held in storage by a prominent Southern producer, and on which the owner, through his broker, seems to be willing to accept something less than $13.50. Local offices will not admit knowing anything of this lot, but it is generally conceded that this sized tonnage, requiring cash and immediate removal to avoid storage and handling charges, will not be easily placed, even at $13.25. The Southern situation seems to be somewhat clouded, and it is practically certain that there has been a break in the spot market of something like 25c., if not more. A buyer for a large sanitary manufacturing concern has been here looking up some bargains, and it is believed has secured 1000 tons or more at a price approximating $13.75, Birmingham, for No. 2, for comparatively early shipment. Ohio producers seem firm at $17, at furnace, for No. 2, for any delivery, an offer of $16.50, Ironton, on a 2000-ton lot of standard Northern for delivery in the last half having been turned down by the furnace. There is a further weakness in Valley iron, and a sale of 500 tons of malleable for Pennsylvania shipment at about $16.50, at furnace, is noted. The largest steam pump interest is seeking some iron for its Eastern plants—high manganese, silvery and analysis Virginian iron—some for early delivery. The St. Louis steel interests are still negotiating for basic. Melters in this territory are apparently covered largely for the remainder of the first half and are not to be tempted by 25c. to 50c. per ton concessions. About the only real change in the situation is the now established fact that $14 can be done over the entire year on Southern and $17 on Northern, with melters who are not covered for last half waiting for a possible break in the second quarter or during March. For prompt shipment and remainder of the first half, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote as follows, f.o.b. Cincinnati:

Southern coke, No. 1 foundry	$17.50 to $17.75
Southern coke, No. 2 foundry	17.00 to 17.25
Southern coke, No. 3 foundry	16.50 to 16.75
Southern coke, No. 4 foundry	16.00
Southern coke, No. 1 soft	17.75
Southern coke, No. 2 soft	17.25
Southern gray forge	15.75
Ohio silvery, 8 per cent. silicon	21.20
Lake Superior coke, No. 1	18.70
Lake Superior coke, No. 2	18.20
Lake Superior coke, No. 3	17.70
Standard Southern car wheel	24.75 to 25.25
Lake Superior car wheel	21.75 to 22.25

(*By Mail.*)

Coke.—The market is quiet. Reports from the Connellsville region indicate a still further restriction in output. Where there has been a little accumulation of furnace grades, blast furnaces needing coke have been enabled to contract for spot lots at around $2 per net ton at oven. It is understood that some 4000 to 5000 tons were negotiated last week on this basis for shipment South. Connellsville foundry grades are quotable for spot and reasonably early delivery at $2.50 to $3.25, and on contract $2.90 to $3.35 at oven. Wise County foundry grades are quotable at $2.75 to $3 for the first half, and it is quite possible for the second half. Furnace grades are quiet and $2.50 is probably being shaded for desirable business in the Wise County district.

Finished Iron and Steel.—So little new business is coming in to the selling offices of the large interests that the market from that viewpoint is considerably softer, although it is not so regarded by the jobbers and warehousemen. In structural shapes there is no new business recorded in this immediate territory, but mills do not evidence any uneasiness, and the larger interests are still asking 1.60c., Pittsburgh, and are getting 1.65c., on small orders. Steel bars continue strong and 1.60c., Pittsburgh, is still asked and obtained, with certain interests rejecting any but choice business at these quotations, although 1.50c. has been done. Structural material out of stock is selling at 2c.; steel bars, 1.90c., and iron bars, 1.75c. to 1.85c. Local mills are said to be disposing of some bar iron stock at 1.60c., although the quoted price is 1.65c., Cincinnati. Dealers report warehouse stocks moving well, and for quick deliveries on structural material certain interests are getting 1.80c.

Old Material.—There is no interest in scrap of any kind, and the local market is from 50 cents to $1 off in all items. All dealers are holding for higher prices and the expected last half demand. Mills are evidencing no interest whatever in the market and are known to have rejected some apparently attractive business put up to them by holders of excessive stocks. The expected demand is now estimated to be farther off, and few are hopeful of any great improvement before July 1. All quotations given are nominal, but the following are as representative of the market as is possible to make them at this time:

No. 1 railroad wrought, net ton	$14.00 to $14.50
Cast borings, net ton	7.50 to 8.00
Heavy melting steel scrap, gross ton	14.25 to 14.75
Steel turnings, net ton	9.00 to 9.50
No. 1 cast scrap, net ton	12.50 to 13.00
Burnt scrap, net ton	9.00 to 10.00
Old iron axles, net ton	18.00 to 18.50
Old iron rails, gross ton	17.50 to 18.00
Old steel rails, short, gross ton	15.00 to 15.50
Old steel rails, long, gross ton	16.00 to 16.50
Relaying rails, 56 lb. and up, gross ton	23.00 to 24.00
Old car wheels, gross ton	15.00 to 15.50
Low phosphorus scrap, gross ton	17.00 to 17.50

Cherokee Furnace of the Alabama & Georgia Iron Company, at Cedartown, Ga., blew in on the 10th inst. on charcoal iron, after a long idleness. The selling agents are Rogers, Brown & Co.

Cleveland.

CLEVELAND, OHIO, February 15, 1910.

Iron Ore.—A few Eastern furnace interests are figuring on fair sized tonnages, but do not seem ready to close contracts. Other consumers seem to be pretty well covered, but a limited buying is expected later in the season, as some have not yet bought all they are expected to need. Dock shipments continue fair and are expected to increase considerably as soon as weather conditions become more favorable. We quote prices as follows: Old range Bessemer, $5; Mesaba Bessemer, $4.75; old range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—Inquiries for foundry iron for last half delivery have practically ceased to come in, and sellers are making no efforts to interest consumers, realizing that under the present unsettled condition of the market it would be practically impossible to make sales. The only foundry inquiry of any size that developed during the week was for 1000 tons of No. 2 for last half delivery from a northern Ohio furnace manufacturer. Buyers are looking for lower prices, and both buyers and sellers appear willing to await developments. Some of the furnace interests are anxious to dispose of their unsold first half tonnage, but they are not trying to force it off by quoting low prices. For last half delivery No. 2 foundry is held nominally at $17.50, Valley furnace, but it is doubtful if sales could be made at present much, if any, above $17. For first half delivery No. 2 foundry is quoted at $16.75, Valley furnace. A leading seller of Southern iron in this market has withdrawn quotations for the second and third quarter until conditions improve. For prompt shipment and first quarter we quote, delivered Cleveland, as follows:

Bessemer	$18.90
Northern foundry, No. 1	18.00
Northern foundry, No. 2	17.50
Northern foundry, No. 3	17.00
Gray forge	17.15
Southern foundry, No. 2	18.35
Jackson County silvery, 8 per cent. silicon	21.55

Coke.—Prices on furnace coke for spot shipment are still weak, but do not appear to show any further decline. Quotations of slightly under $2 per net ton at oven are heard, but it is claimed they are not for Connellsville coke. There is little inquiry for either grade. We quote standard Connellsville furnace coke at $2.30 to $2.40, per net ton, at oven, for spot shipment. Connellsville 72-hour foundry coke is held at $2.90 to $3.15 at oven for both spot shipment and contracts for the first half.

Finished Iron and Steel.—Some new business is coming out in small lots. Specifications on contracts continue only fair. Little is coming from the railroads and car companies. Manufacturing plants, however, continue busy and the demand from this source seems to be about as good as ever. While mill agencies are not getting a large volume of new business, jobbers report considerable improvement in warehouse orders and some good mill orders for steel bars. Taken all in all, market conditions are regarded as fairly satisfactory, with the exception of structural material, and this is attributed largely to the unusually severe winter weather that has prevented outdoor work. As a result orders that were expected from fabricators are being withheld. Deliveries on structural shapes have improved and some of the mills are now able to make shipments in four or five weeks. This improvement in deliveries has resulted in an easing up in prices, and some of the mills that have been holding to 1.60c., Pittsburgh, are now taking structural orders at 1.55c. Deliveries on steel bars at last show a slight improvement. Prices continue firm at 1.50c., Pittsburgh. Higher prices, up to 1.60c., are being secured for early delivery. The demand for plates continues fair, with prices firm at 1.55c. to 1.60c., Pittsburgh. The demand for sheets continues very good. Prices are firm. Pickled sheets are scarce, the heavy demand being attributed largely to the consumption by the automobile trade. Blue annealed sheets are also hard to get for early delivery. The leading interest has taken an order for 900 tons of standard section rails to be used in the development of a mine property in the Lake Superior district. The demand for forging billets shows improvement. Some orders have been placed for early delivery at $32.50, Eastern mill, or $35.65, delivered Cleveland. The demand for iron bars continues fairly active and prices are firm at 1.60c. to 1.65c., Cleveland.

Cast Iron Pipe.—The Director of Public Service of the city of Cleveland will receive proposals February 21 for 3400 tons of cast iron pipe, 3 to 30 in., for the water works department. On the same date bids will also be received for 200 tons of special castings, 3 to 30 in. in diameter; about 900 valves for cast iron water pipe, 3 to 24 in., inclusive, and 200 4-in. and 200 6-in. fire hydrants.

Old Material.—The market is very dull and prices are decidedly weak. There is practically no demand for any grade, and dealers in order to dispose of material coming in on cars are offering it at considerable concessions rather than unload it in their yards. These offerings have softened the market, so that the present quotations are largely nominal, most of them being higher than the prices at which small lot sales are being made. Nominal quotations on several grades are 50 cents a ton lower than a week ago. In spite of the present weakness, however, dealers feel that prices will advance as soon as a buying movement starts, and little if any of the stock in the yards is being offered at the present prices. Prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$15.75 to $16.25
Old iron rails	18.50 to 19.00
Steel car axles	20.00 to 20.50
Old car wheels	16.50 to 17.00
Heavy melting steel	15.50 to 16.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	16.00 to 16.50
Light bundled sheet scrap	10.50 to 11.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	8.25 to 8.50
Iron and steel turnings and drillings	9.50 to 10.00
Steel axle turnings	11.00 to 11.50
No. 1 busheling	13.50 to 14.00
No. 1 railroad wrought	15.50 to 16.00
No. 1 cast	14.50 to 15.00
Stove plate	12.75 to 13.25
Bundled tin scrap	11.00 to 11.50

Buffalo.

BUFFALO, N. Y., February 15, 1910.

Pig Iron.—There is a little inquiry for early delivery to meet supplementary requirements by some of the large consumers who were recently in the market for good sized tonnages for last half delivery, but who are now apparently holding off on the renewal of negotiations for last half, waiting a further classifying of the situation. The general run of new business is, however, very quiet, the situation not yet being devoid of depression and hesitancy. One prominent pump manufacturing concern has had inquiries out for a considerable tonnage, but without closing any portion of it in this district. Virginia furnaces seem to have matters their own way with the Eastern and New England trade at present, the cut prices they are quoting taking such business as is in sight, furnacemen in this district not caring to compete. Shipments and consumption on contracts keep up in remarkable volume considering the severity of the weather and the pessimistic views expressed in some quarters. The following prices fairly represent quotations made by most furnaces for current, second and third quarter deliveries, per gross ton, f.o.b. Buffalo:

No. 1 X foundry	$17.50 to $18.00
No. 2 X foundry	17.25 to 17.75
No. 2 plain	17.00 to 17.25
No. 3 foundry	16.75 to 17.00
Gray forge	16.50 to 16.75
Malleable	17.50 to 18.00
Bessemer	19.50 to 19.75
Basic	18.00 to 18.50
Charcoal	20.50 to 21.00

Some furnaces, however, will not take last half deliveries at these prices, as production costs are advancing steadily.

Finished Iron and Steel.—Current sales in general lines keep up pretty well, with many indications of improvement, especially in structural shapes. In bar material there is no cessation in the pressure on mills for delivery, the earliest deliveries obtainable from most mills being from three to four months ahead. The warehouse people and some of the smaller mills are reaping the benefit at prices averaging $5 per ton above the prices at the larger mills. In structural plates, 1.60c., Pittsburgh base, is the current price from mill, warehouse prices running about $7 per ton above mill prices. In structural material the demand is ac-

tive. One of the leading agencies has inquiry for and is about to close a Canadian order for 2000 tons. The McClintic-Marshall Construction Company has been awarded contract for the fabrication and erection of the 560 tons of steel for the new plant of the King Sewing Machine Company, Buffalo, quick delivery being an important consideration. The Lackawanna Bridge Company, this city, has taken contracts for a large quantity of bridge material, including 600 tons for the Detroit, Toledo & Ironton, 800 tons for the Kansas City Southern, three small bridges for the Atlanta, Birmingham & Atlantic, 150 tons, and several bridges for the Atlantic Coast Line.

Old Material.—The market remains without life. Material is going forward on contracts with a fair degree of regularity barring interruptions by unfavorable weather conditions. Dealers incline to the belief that an improvement in the situation will be apparent within the next month or two. Old car wheels are lower. We quote nominal prices as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$16.00 to $16.50
Low phosphorus steel	19.50 to 20.00
No. 1 railroad wrought	16.50 to 17.00
No. 1 railroad and machinery cast scrap	16.00 to 16.50
Old steel axles	20.00 to 20.75
Old iron axles	25.00 to 25.50
Old car wheels	16.00 to 16.50
Railroad malleable	16.50 to 17.00
Boiler plate	13.50 to 14.00
Locomotive grate bars	13.00 to 13.50
Pipe	13.50 to 14.00
Wrought iron and soft steel turnings	10.50 to 11.00
Clean cast borings	9.00 to 9.50
No. 1 busheling scrap	13.50 to 14.00

Birmingham.

BIRMINGHAM, ALA., February 14, 1910.

Pig Iron.—The status of this market is probably less determined than at the time of last report, though no changes have been made in quotations. Following the fairly heavy sales of the week previous, the aggregate engaged the past week is good, but no doubt represents a larger number of purchases and a lower average price. Rumors are current that spot shipments and even deliveries to cover the remainder of the first half have been had at concessions from the $14, Birmingham, schedule. It is known that the $14 basis has been made to cover a longer period of delivery than had before been the case, but no confirmation can be had of sales at lower figures and none of the recent considerations were of hardly sufficient volume to induce a concession. The most significant transaction reported was a sale of 500 tons for first half delivery which was closed at $14, Birmingham. The producing interests who advanced their quotation on third quarter deliveries to $14.50 for No. 2 foundry have accepted such deliveries under special agreement without the premium, and it is probable that deliveries covering the entire second half would not be refused under similar conditions. None of the selling interests is solicitous of orders for future delivery and all manifest a disposition to await the taking of more definite form by the demand generally. This is true of the merchants as well as producers, as in some cases the former have withdrawn their holdings from the market for the present. The theory that existing conditions are primarily due to the extensive provision by melters when the market price was considerably lower than it is to-day is, of course, not discredited, but with the production at present considerably less than the actual consumption it seems reasonable to believe that prices have reached their lowest level. It is true that the warrant iron being held will be a factor later on, as well as any failure of furnace companies to deliver tonnage booked at higher prices than now prevail, but it must be considered that higher cost at the furnace is anticipated and that the present adjustment of the production to the consumption will hardly be changed for some months.

Old Material.—Dealers' asking prices are revised by a reduction of 50c. per ton in the quotation of each grade, which is believed to be warranted by the condition of the pig iron market. Offers of old car wheels have recently been made at lower figures than quoted below, but the tonnage available was limited. The dismantling of a local foundry that has been out of operation for three years added material to dealers' stocks during the week at prices in line with those now quoted. The supply generally is irregular and the demand fairly satisfactory. We quote revised prices as follows, per gross ton, f.o.b. cars here:

Old iron axles	$19.50 to $20.00
Old iron rails	15.50 to 16.00
Old steel axles	18.50 to 19.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	11.00 to 11.50
No. 2 country wrought	11.00 to 11.50
No. 1 machinery	12.50 to 13.00
No. 1 steel	11.75 to 12.25
Tram car wheels	12.00 to 12.50
Standard car wheels	14.00 to 14.50
Light cast and stove plate	10.00 to 10.50

Cast Iron Pipe.—The situation locally has not changed, all concerns announcing orders to compare favorably with the output, with the possible exception of one or more sizes. In the absence of evidence to the contrary, prices as last published are quoted; but in view of the lower cost of raw material it is probable that such quotations are subject to more extensive shading than at the time of last report. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., $25; 8 to 12 in., $24; over 12-in., average $23, with $1 per ton extra for gas pipe.

The Bullard Car Door Equipment Company will commence operations at its Birmingham plant Monday next.

Announcement is made that the local plants of the Central Foundry Company, now in receiver's hands, will continue in operation. The properties consist of soil pipe plants at Anniston, Ala.; Holt, Ala., and South Pittsburg, Tenn., and a plant for the manufacture of Universal water pipe at Bessemer, Ala.

St. Louis.

ST. LOUIS, February 14, 1910.

Of interest to St. Louis business men is the number of new manufacturing plants which will be built in the city and its immediate vicinity this year, together with extensions of plants already existing. While moderate weather has of late prevailed there has been no general resumption of building operations. Conditions in territory tributary to St. Louis are reported favorable. In the South cotton is being marketed rapidly at the prevailing high prices, and in the Southwest grain is also moving freely to the centers and commanding good figures.

Coke.—The weakness reported in other markets in coke is also felt here and for the same reason—namely, lack of demand. As is well known, so far as this commodity is concerned, its price is usually mainly controlled solely by this factor. Furthermore, there is no practicable way of increasing or stimulating the demand under ordinary conditions, and sellers being aware of this confine their efforts to seeking to secure as large a share of the trade that is passing as possible. There are no large inquiries reported, and sales are confined almost entirely to small lots for early shipment. Leading brokers are shading $3 for standard 72-hour Connellsville for spot, and are holding forward delivery at $3. Some producers are instructing their agents to name higher figures, consequently some brands are held at $3.15 to $3.25 for shipment over the year. These figures are per net ton, f.o.b. oven.

Pig Iron.—Business in pig iron for the past week ruled even duller than the preceding one, and houses which under ordinary conditions would not seek to book small orders are in the field for this trade, which indicates the limited demand and the keen competition at present prevailing. The only sale of consequence reported beyond carload business was 250 tons of ferrosilicon for shipment over the first half. The representative of a leading Birmingham producer, who has just returned from that district, states that it is estimated that not over 17,000 tons of warrant iron is now on the market. At present there are but 17 furnaces in blast there. Stocks in yard are approximately 130,000 tons, mostly due on contract. The leading companies have quite large commitments for future delivery, but in many instances buyers are seeking to extend the period of shipment, the tendency of which is to push some business into the third quarter. Preparations are being made to shift from foundry to basic, for which latter iron there is a better inquiry. Such weakness as may develop will arise from the smaller furnacemen wishing to sell for prompt shipment and short selling by merchant houses. It is believed in some quarters here that, with better conditions in Wall Street, railroad buying will become a more important factor in the iron trade and consequently bring about a more satisfactory situation. Notwithstanding the dullness of trade, we hear of no concessions in price and renew our quotations of last week: Southern No. 2 foundry for shipment over the first half, $14; over the last half, $14.50, f.o.b. Birmingham; southern Ohio, $17, f.o.b. furnace.

Old Material.—Stagnation practically prevails in the local market, so far as consumers are concerned, and there is but little business doing among the dealers. There are no offerings by the railroads to report for the week. Stocks are small and are held quite firmly. While transactions are limited, dealers stand ready to pay outside prices to railroads in order to bring out what stock they may have to offer. Relaying rails are very scarce and are so urgently wanted that quotations have been advanced. There are but few price changes to note. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$16.00 to $16.50
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	14.50 to 15.00
Relaying rails, standard sections, subject to inspection	26.00 to 26.50
Old car wheels	17.00 to 17.50
Heavy melting steel scrap	14.50 to 15.00
Frogs, switches and guards, cut apart	14.50 to 15.00

The following quotations are per net ton:

Iron fish plates	$14.50 to $15.50
Iron car axles	20.50 to 21.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.00 to 14.50
Railway springs	13.00 to 13.50
Locomotive tires, smooth	16.50 to 17.50
No. 1 dealers' forge	11.50 to 12.00
Mixed borings	8.00 to 8.50
No. 1 busheling	13.00 to 13.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	13.50 to 14.00
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	12.25 to 12.75
Agricultural malleable	9.75 to 10.25
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	9.50 to 10.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	10.50 to 11.00

Lead, Spelter, Etc.—Lead is ruling quiet at 4.50c.; spelter is dull at 5.45c., East St. Louis; zinc ore, $40 per ton, Joplin base, and market weak. Tin is up 20c. per 100 lb.; antimony unchanged; copper unchanged. The demand for finished metals for the week showed up well in the aggregate.

The Illinois Concrete Machinery Company, Buda, Ill., has been incorporated; capital stock, $140,000; incorporators, L. H. Scott, C. S. Scott and Howard H. Priestly.

The A. B. Cockerill Smelting Company, Joplin, Mo., controlling in all its plants 26 furnaces, with a weekly capacity of 2000 tons of ore, is stated to be in the hands of the bondholders, but it is expected it will arrange to continue the plants in operation, provided that ore prices do not get farther out of line in proportion to that of spelter, and as the surplus of both lead and zinc ores is growing and the market weak the prospect for resumption of business in the near future is said to be encouraging.

The American Stove Company has bought more than 8 acres of land in St. Louis for a site for a large stove factory, which will require a force of 700. The plant will cost upward of $500,000. The old factory at Ninth street and Chouteau avenue, on the completion of the new plant, will be used as a storehouse.

The National Enameling & Stamping Company will expend $60,000 for additional facilities at its steel plant at Granite City, Ill. The improvement will give employment to 200 additional men. The blueware department, which has been closed for a year or more, is to be reopened and additional help will be required in this shop.

Stone & Webster, Boston, Mass., have acquired all franchises, rights and privileges for the construction of the great dam across the Mississippi at Keokuk, Iowa, to furnish electric power to the United Railways, the Union Electric Light & Power Company and the Laclede Gas Light Company. The dam, it is expected, will develop about 200,000 hp. Its cost is estimated at $20,000,000. Work is now in progress.

New York.

NEW YORK, February 16, 1910.

Pig Iron.—The only important inquiry in the past week came from a large pump interest, the total of a variety of lots of differing analyses being about 6100 tons. Early deliveries are asked for, chiefly at Harrison and Holyoke plants, while a smaller lot is wanted at Buffalo. Further sales of Virginia iron in several hundred ton lots are reported from New England, prices ranging from $15.25 to $15.50 for No. 2, at furnace. The pig iron freight reductions by Virginia lines become effective March 10. In the New York District business has been confined to small or moderate lots for early delivery. Foundries in general are busy, but in some cases low prices on castings are reported, particularly on architectural work. Alabama irons are offered at $13.50, at furnace, for No. 2, and this price can be shaded, it is understood, though such offerings are of iron in the hands of speculators. The larger Southern furnace interests are quoting $14 for forward delivery, without doing business. We quote Northern iron, delivered in New York, as follows for first quarter: No. 1, $19 to $19.25; No. 2 X, $18.75 to $19; No. 2 plain, $18.50. For the same delivery we quote Southern iron at $18.75 to $19 for No. 1 and $18.25 to $18.50 for No. 2.

Steel Rails.—An inquiry has come up for 3850 tons for a trolley line in Connecticut, with offices at Norwich. The Chicago District sales for the week, amounting to about 13,000 tons, include one of 8700 tons just concluded in New York.

Finished Iron and Steel.—Building is slack, accounting for some of the dullness in the structural material market, but several new inquiries have come up in the last few days and there is prospect of increased activity shortly. The new business in steel bars is now a little under the output, giving the mills the much needed opportunity to gain on the large volume of orders on their books, and deliveries are already a little better. Practically all of the contracts for the first half are in and it will probably be a month or more before contracts will be taken for the third quarter. The plate mills are well up with their orders and deliveries are being made by some in a week or even less, except on specials. Bids have been closed on a loft building on West Thirty-ninth street, New York City, for which Mulliken & Moeller are the architects, requiring 800 tons of steel, and another loft building in Brooklyn, at Grand and De Kalb avenues, requiring about 1200 tons, but the awards have not been announced. The fabricating of the steel for three other loft buildings has been contracted for: Milliken Bros., Inc., has one on West Seventeenth street of 500 tons and one on West Forty-fifth street of 900 tons, and the Hinkle Iron Company one on East Thirty-third street of 200 tons. The American Bridge Company has the contract for a chemical laboratory on East Forty-first street requiring 700 tons. For the Dunn-Salmon Building at Syracuse, N. Y., the Syracuse Bridge Company will fabricate about 5000 tons, using Bethlehem shapes, and 600 tons of these shapes will be furnished through the Hedden Iron Construction Company for the Commercial and Manual Training High School at Newark, N. J. The Eastern Steel Company secured the steel for the Rockefeller Building in Cleveland, Ohio, which will take between 1200 and 1400 tons. Several new bridge contracts have been placed, among them three, aggregating 550 tons, taken by the American Bridge Company, and the Lackawanna Bridge Company has an order for 1400 tons of bridge material from the Detroit, Toledo & Ironton and the Pere Marquette railroads. Inquiries for between 12,000 and 14,000 tons of bridge material, it is understood, have been withdrawn by the Chicago & Northwestern Railroad. Certain desirable orders for plain structural material are being taken as low as 1.66c., New York, but in general the market is still 1.71c., and plates are held firmly at the same price. Steel bars are quoted at 1.66c., New York, and bar iron at 1.70c. to 1.75c., the lower price being for large quantities or ordinary bar iron. The bolt and nut manufacturers have reaffirmed prices.

Ferroalloys.—There is but little doing in the ferromanganese market, and the price has weakened somewhat. Offerings have been made at $43.50, seaboard. Ferrosilicon is in the same situation, as buyers seem to be out of the market as far as the New York situation is concerned. The price seems to be about $62.50.

Cast Iron Pipe.—The letting at Worcester, Mass., February 8, brought out the low price of $25.35, delivered. Two foundries, one in New York and one in New Jersey, both submitted this bid. While a few municipal lettings have been advertised in the East, the quantities named are invariably small. Some good inquiries from private water and gas companies are in the market. The volume of business is about the same as usual at this season. Carload lots of 6-in. are unchanged at $25.50 to $26 per net ton, tidewater.

Old Material.—About the only transactions now reported are purchases by dealers to cover short sales made some time ago. Consumers seem to be completely out of the market. Holders are showing more anxiety to realize and quotations are lower. The following quotations are per gross ton, New York and vicinity:

Rerolling rails	$14.50 to $15.00
Old girder and T rails for melting	14.00 to 14.50
Heavy melting steel scrap	14.00 to 14.50
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	24.00 to 24.50
Old steel car axles	19.50 to 20.00
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track scrap	14.00 to 14.50
No. 1 yard wrought, long	14.00 to 14.50
No. 1 yard wrought, short	13.50 to 14.00
Light iron	8.00 to 8.50
Cast borings	9.00 to 9.50
Wrought turnings	10.50 to 11.00
Wrought pipe	13.50 to 14.00
Old car wheels	14.00 to 14.50
No. 1 heavy cast, broken up	14.00 to 14.50
Stove plate	11.00 to 11.50
Locomotive grate bars	11.00 to 11.50
Malleable cast	16.00 to 16.50

Another Corrigan, McKinney & Co. Furnace at Cleveland.—Corrigan, McKinney & Co. have decided to erect a second blast furnace in Cleveland, which will be nearly a duplicate of their new stack under construction the past year and which, it is expected, will be ready to blow in early in March. Plans and specifications for the second stack have been prepared and bids are now being asked for. The furnace will be 20 x 80 ft., and will have a daily capacity of about 350 tons. Work on it will probably be started in the spring. When they secured their present furnace site in Cleveland room was provided for two stacks. Ore handling equipment has been installed sufficient for handling ore for both and for shipment by rail to other furnaces. The ore handling plant consists of two 10-ton Hulett unloaders and one 10-ton Brown Hoist ore bridge.

Metal Market.

NEW YORK, February 16, 1910.

THE WEEK'S PRICES.

Cents per pound.

	Copper.			Lead.		Spelter.	
Feb.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
10	13.75	13.50	32.75	4.70	4.55	5.90	5.70
11	13.75	13.50	32.70	4.65	4.50	5.80	5.60
14	13.75	13.50	33.00	4.60	4.45	5.65	5.55
15	13.75	13.50	33.35	4.55	4.40	5.60	5.45
16	13.75	13.50	33.20	4.55	4.40	5.60	5.45

The metal market continues very flat, the only metal showing any advance being tin, in which, however, there is but little trading. The January statistics of the Copper Producers' Association have had no effect whatever on the market, as consumers seem to be thoroughly supplied. Spelter has slumped and is still declining. Lead is cheaper in the West and noticeably weaker here.

Copper.—Not since the Copper Producers' Association has been issuing statistics has the publication of figures had so little effect on the trade as those issued February 10. As a matter of fact, although the figures on the face looked encouraging the market has weakened since then. The Government report of exports of copper for January shows that 26,699 tons were sent abroad, and this was approximately 10,000 tons less than the quantity named by the association. It appears that the latter figured copper ready for shipment in January, but which was not sent abroad until early in February. The real nugget of the situation, however, is the fact that consumers seem to be well supplied and show no inclination to buy. Some of the leading producers who were out of the market for a time have been making small sales of electrolytic to prominent consumers at 13.50c., and there are reports of resale lots at 13.37½c. The copper sold during the last week, however, has amounted to little and prices are largely nominal. The large producers are becoming restless, as quiet offerings in the market indicate, and they might be tempted to institute a buying movement by making still lower offerings. Private advices received by American houses from abroad state that European figures will show a reduction of approximately 5000 tons. This might tend to help matters. We quote electrolytic nominally at 13.50c. and lake at 13.75c. Lake seems to be somewhat stronger than electrolytic, and those having the metal are holding it firmer. The exports of copper so far this month were 18,086 tons. London prices to-day were spot, £50 18s. 9d.; futures, £59 16s. 3d. The sales were spot, 700 tons; futures, 800 tons. The market was easy.

Pig Tin.—Although the price of pig tin has advanced over last week in response to an upward movement in the London market, where pig tin has been put forward £2, there are few buyers here and quotations are more or less nominal. The advance in London is attributed to reports of heavy floods in tin producing sections in the Straits and heavy buying by a London house which acts for a syndicate of French traders. Pig tin was sold in New York on Monday for 33c., but sales were made from stock on board a boat in dock at 32.90c. On Tuesday the price of tin on board the boat in question was advanced to the New York market, which went to 33.35c. Spot tin is a little more plentiful here and if the optimistic feeling in London prevails buyers who need the metal might be frightened into the market by the impression that there will be further advances. The local market fell off this afternoon to 33.20c. The latest cablegram from London to-day stated that the market there had dropped nearly £1. Spot tin was sold there for £150 17s. 6d. and futures for £152 10s. The sales were 150 tons of spot and 500 tons of futures. The market was weak.

Tin Plates.—Heavy demands and full stocks sum up the tin plate situation. Swansea plates are being sold at the same price as last week, the advance in the movement abroad having been checked for the time being. In New York 100 lb. coke plates are still $3.84 and outside interests are asking substantial premiums.

Lead.—Lead has slumped in St. Louis, where outside sellers are offering it at 4.40c. There has been a steady decline in that market all the week. The American Smelting & Refining Company continues to hold the price here at 4.70c., although lead is being bought in St. Louis at the prevailing price and shipped here, where it can be sold at 4.55c. Some of the outside sellers in the New York market feel that the leading interest will attempt to check the downward impulse by holding prices firm. If confidence is restored in St. Louis, it is thought that better prices will shortly ensue, as the usual spring buying movement is due. As a matter of fact, the weakness of the St. Louis market is attributed to the absence of buyers who are usually in evidence at this time of the year. We quote the market in St. Louis at 4.40c. and here at 4.45c.

Spelter.—Spelter has declined further, and there is every indication of a continuance in that direction. The situation seems to be that the manufacturers have rather overplayed their hand concerning their plans to control prices. Consumers are well supplied, and as spelter is still being produced in record-breaking quantities it appears that the price must necessarily go lower, although it is hoped and thought in the trade that they will not reach the low record of last year, which was 4.62½c. Present prices are a far cry from the 7c. spelter which some of the optimistic ones predicted the beginning of the year would be the market figure within three months. Market statisticians are comparing the production of 1909 with that of 1908. In 1909, according to Government figures, 268,215 tons were produced, while in 1908 the production amounted to 210,424 tons. As stocks in smelters' hands decreased 9000 tons and imports increased 10,000 tons in 1909, consumption last year was 70,000 tons over 1908. This increase, however, it is pointed out, was not in proportion with the 1909 consumption of other metals, and it is explained that large stocks are now in the hands of consumers and dealers. We quote the New York market to-day at 5.60c. and in St. Louis it can be bought at 5.45c. There are reports of offerings at even lower prices.

Antimony.—Hungarian grades of antimony can be bought for 7.30c., and as the market is flooded with those grades the situation of antimony is weak. Consumers are buying to some extent, but the dealers are not overconfident as to the situation, as there is plenty of antimony in sight, so low prices prevail. Cookson's is 8.50c. and Hallett's is being sold for 8.25c., although some dealers who bought at higher figures are asking 8.37½c.

Old Metals.—The market is lower. Dealers' selling prices are as follows:

	Cents.
Copper, heavy cut and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	10.25 to 10.50
Lead, heavy	4.40 to 4.50
Lead, tea	4.05 to 4.15
Zinc scrap	4.75 to 5.00

The German Iron Market.

BERLIN, February 3, 1910.—The market has been encouraged by various pieces of good news within the past week. The upward price movement has continued. It now transpires that the Steel Syndicate at its meeting of last week voted to reduce by 5 marks the export drawback on semifinished material used in producing finished forms for the foreign market. The reduction is from 15 to 10 marks a ton. The Continental Girder Syndicate, composed of German, Belgian and French mills, with the Germans playing the biggest part in it, has just cut down the rebate on export orders for girders by 3 shillings a ton. This applies chiefly to the English market, where the recent advance in prices has encouraged the Continental mills to raise their demands. The Rhenish-Westphalian manufacturers of bands and strips voted last week, in view of the advance on semifinished material by the Steel Syndicate, to put on 5 marks a ton on their specialty. This applies to all supplementary orders that may come in for the first half of the year. It is a significant fact that the combination refused to open sales for the third quarter of the year, evidently hoping to be able to adopt still higher prices later on.

But this does not exhaust the encouraging news. It was announced about the end of last week that Belgian concerns had contracted for nearly 60,000 tons of German pig iron and that considerable further inquiries from Belgium have come in. The iron in question is of the so-called Thomas grade, a kind that is very seldom exported to Belgium. A still more important export order has just been taken by the Steel Syndicate for steel rails and ties for the Baghdad Railway. The contract amounts to nearly $3,600,000, and is to extend over a number of years.

The price advances already mentioned are expected to be followed soon by further sections of the market. Wire rods and wire are set down among expected early advances. The bar combination met to-day and was expected to vote higher prices.

The Siegerland ore producers several days ago held a meeting for the purpose of prolonging their trade combination and selling agency, but they failed to reach an agreement. The mines connected with blast furnaces have hitherto enjoyed considerably greater privileges in the combination than the isolated mines, and they declined to enter it again under the terms offered to them. The meeting voted to give them three weeks to consider the question.

The news from the trade this week indicates that there is a very active home demand for pig iron of all grades. From the Luxemburg-Lorraine region it is reported that furnaces are very busy. The total rise in pig iron prices there in January was 3 marks. The Silesian District, where the improvement of the trade has been considerably slower than in the Western regions, now reports that the market has begun to show a stronger tendency.

The Machinery Trade.

NEW YORK, February 16, 1910.

Orders for more than half a million dollars' worth of machinery have been placed in the metropolitan territory within the last 10 days. A large part of this business came from the Bethlehem Steel Company, which closed out the extensive list that was placed before the trade about three weeks ago. Two of the leading New York machinery houses got a large part of this business, and one prominent firm succeeded in getting orders for more than $100,000 worth. There was so much to be placed, however, and the line of equipment desired was so varied, that the trade in general benefited largely. The placing of such a large volume of business in so short a time established somewhat of a record in the way of a buying achievement, and when it is considered that much of the machinery purchased was in the line of special equipment, the working out of the buying details so expeditiously reflects credit on those in charge of the purchasing details, considering the fact that in these times of delayed deliveries promptness in placing orders for badly needed equipment counts for something.

In the matter of delayed deliveries there is considerable complaint among dealers to the effect that manufacturers are in many cases not keeping their promises, and the problem of supplying some kinds of machine tools with any degree of promptness is becoming a vexatious one to those who are handling the selling details.

The Lozier Motor Company has about completed the buying which it began two weeks ago and it is estimated that the company has purchased about $200,000 worth of equipment during that time. The Baltimore & Ohio Railroad is still buying against the list it has had before the trade, but there is no news as yet of purchases against the list recently issued by the Norfolk & Western Railroad. There is a decidedly better demand for equipment for small and medium sized power plants and business in that line, which has not been keeping pace with the general machinery trade of late, appears to be picking up as inquiries are becoming quite numerous and some good orders have been placed.

Considerable buying is being done by the Empire Mfg. Company, Goldsboro, N. C., for a sawmill, planing mill, veneer mill, &c., which the company has in course of erection. Orders have been placed for lathes and special woodworking machinery with the Coe Mfg. Company, Painsville, Ohio. The sawmill will be exclusively fitted for turning out gum veneer box material, and the company is now in the market for a full equipment of glueroom machinery for this class of work, as well as several power feed double cut-off saws and an electric generator to furnish power for an electric crane and to operate small machinery.

The Southern Power Company, Charlotte, N. C., is arranging to build an emergency power plant to generate electricity by steam power. This plant will be used as an emergency station for the company's hydroelectric transmission at Greeneville and it will be about 15,000 hp. in size. The equipment for the plant is now being arranged for by W. S. Lee, Jr., chief engineer of the company, and the boilers and electrical machinery have been ordered.

Inquiries for Power Equipment.

Among the inquiries before the trade for small power equipment is one from the city of Asbury Park, N. J., for two 50 k.v.a alternators for municipal power equipment, and another from the Methodist Book Concern, New York, for new boilers, engines and generators to be installed in the company's present New York plant to replace worn out equipment. The latter named plant will consist of three 100-kw. units, and a plant of a similar size will be required by the proposed Newark Manual Training School, on which bids for the general contract are now before the Board of Education in that city.

The Patterson & Allen Engineering Company, 2 Rector street, New York, which is a subsidiary company of the Scully Steel & Iron Company of Chicago, Ill., is getting equipment for its plant in Jersey City for the manufacture of valves, &c. The company has inquiries out for some machine tools and special machinery which is to be added to manufacturing equipment now in operation at the Jersey City plant.

The Inman-Pierson Company has been incorporated at Louisville, Ky., with a capital of $100,000, all of which is paid in, for the operation of a large furniture plant for which buildings are now under construction. Charles W. Inman is president of the corporation, H. R. Whiteside vice-president and William A. Pierson secretary and treasurer. The Board of Directors consists of the officers and O. G. Hardin, James R. Duffin and Hesse Runyan.

The National Machinery Mfg. Company, Arch street, Rockaway, N. J., is preparing to move into a larger plant shortly and will be obliged to install additional equipment. The company was recently incorporated with $600,000 authorized capital, to manufacture tools on which patents have been taken out by Thomas Anderson of Rockaway, who is connected with the corporation.

The Virginia Railway & Power Company, Manchester, Va., is arranging to spend about $48,000 in the construction of a car barn and repair shop. The company is now getting the consent of the City Assembly of Manchester for the construction of spur tracks to the site of the proposed shops, and as soon as this permission is granted the contract for the structure and equipment will be given.

The Ross Engineering Company, 408-9 Jacobs Building, Fairmont, W. Va., civil mining and consulting engineer, will shortly place contracts for a wood tipple, cage, engines, &c., as part of the new equipment required at the plant of the Dakota Coal & Coke Company, Fairmont, and also for a wood tipple for the plant of the Haywood Coal & Coke Company, near Shimeston, W. Va.

J. B. McCrary & Co., contractors and engineers, Atlanta, Ga., have been awarded the contract to construct an electric light plant for the municipality of Willacoochie, Ga. The structure will cost about $7000 and only the electrical equipment will be needed, as it will be direct connected with the steam plant now used to operate the city water works, which the engineering company constructed last year.

George J. Brown, whose forge, steel and iron works at Milton and West streets, Brooklyn, N. Y., were burned recently, has purchased four lots on the northeast corner of Franklin and Meserole avenues, where a new building is being erected, and the equipment for the structure is now being arranged for.

The Yarborough & Bellinger Company, Charlotte, N. C., will require icemaking machinery and power equipment to be installed in a plant 72 x 103 ft. in size which is being erected to take the place of a structure which was recently destroyed by fire.

F. L. Schmidt, 136 Thompson street, New York, is buying machinery just now for the manufacture of auto parts which he intends to make at his present plant.

A Corliss engine of 150 to 200 hp., with electrical generator and auxiliary machinery, may be required shortly by the Wm. M. Crane Company, New York, for the power plant of a new stove factory to be erected in Jersey City, N. J.

The Albright Ignition Company, recently organized at Columbus, Ga., by J. J. Albright and others, will manufacture a gas engine specialty particularly adapted to automobile motors.

A steam power plant and pressure machinery for the manufacture of brick will be required by L. C. Libby of the Cookville Coal & Lumber Company, Mt. Pleasant, Tenn., for new clay products works.

In connection with its extensive up-State operations the Rockland Lake Trap Rock Company, New York City, will install a steam turbine generating unit of about 500 hp., which is to be driven by the exhaust from an existing plant.

The Rowe Motor Company will build a factory at Martinsburg, Md., work to begin early in the spring. S. J. Rowe, Waynesboro, Md., is president.

Oliver Bros., Lockport, N. Y., are entering upon the manufacture of auto-vehicle radiators and have installed equipment for that purpose. More is likely to be required within the next few months, as the demand for this product is at present very large.

The Losch Gas & Oil Engine Company will establish a plant at Wyomising, Pa., in the works heretofore occupied by the Economy Power Company, removing equipment to that place from Reading, Pa.

The Taggart Bros. Company, Watertown, N. Y., will install a Corliss engine of about 150 hp., belted to electric generator, and a line of direct current motors for driving machinery in the plant.

The Blaine, Mackay, Lee Company, North East, Pa., will install an 18 x 36 in. Corliss engine for belting to line shafting.

Boilers, heaters, Corliss engines, dynamos and motors will be purchased shortly by John K. Stewart & Sons, Amsterdam, N. Y., who are planning the erection of additions to their factory, including a new power house.

At Frederick, Md., the city authorities have decided upon increasing the capacity of the pumping plant. Bids for machinery will be taken when authority for a bond issue has been granted.

The Zero Valve & Brass Company, Buffalo, N. Y., whose plant recently sustained some damage from fire, will take advantage of the opportunity, in making repairs and replacements, to build for larger capacity.

A new steam turbine power plant of 25,000 hp. will be constructed adjacent to its present station at Marion, N. J., by the Public Service Corporation of Newark, N. J. A battery of 10 tubular boilers of 250 hp. each will furnish steam.

The Velte Machine Company, which has been operating shops at Lawrenceville, Pa., is arranging to establish a plant at Butler, Pa., where ground for this purpose was recently broken.

The Galveston, Houston & Henderson Railway Company is building a new 14 stall roundhouse at Galveston, Texas, which will complete a series of terminal additions, includ-

ing the erection of a large brick woodworking shop, a car repair shed and other improvements aggregating a total expenditure of $100,000. A machine shop, 50 x 200 ft., of reinforced concrete, is also contemplated; the necessary authorization for the expenditure is expected shortly.

Catalogues Wanted.

Frank A. Foster, 29 Kenyon street, Providence, R. I., is shortly going to China to take a position in which he will have considerable to do with machinery and mechanical equipment for railroads. Mr. Foster desires to obtain catalogues and as full information as possible regarding such equipment. He is at present connected with the American Locomotive Company, but expects to leave for China about March 1 and desires catalogues addressed to Davenport Road, Tientsin, China, care of Albert C. Lee.

Automatic Machinery Wanted.

A subscriber of *The Iron Age* desires to obtain information regarding automatic or semiautomatic machinery for tapping holes in drilled horseshoes for the reception of calks. The inquirer wants a machine that will do this work in multiple or gangs. Any communications sent to this office on the subject will be forwarded to the inquirer.

Philadelphia Machinery Market.

PHILADELPHIA, PA., February 15, 1910.

Orders placed by the Bethlehem Steel Company for a large share of the equipment recently inquired for have been the feature of the machinery market during the week. Business estimated as aggregating from $300,000 to $350,000 has been closed, and a number of tools, it is understood, are yet to be bought. Nearly all the important manufacturers as well as merchants shared in the distribution, and, it is stated, the time of delivery had considerable influence in the placing of the orders. No business has yet developed in connection with the inquiries of the Norfolk & Western Railroad, and as far as can be learned the Baltimore & Ohio Railroad has not yet given any orders to the trade in this vicinity. Outside of the Bethlehem Steel Company business sales in this market were less active. Some small business, largely of a single tool character, was closed, but no transactions of any importance were reported. Inquiries are reported to be less numerous, but the lull in demand is believed to be but a temporary one.

Manufacturers have booked a fair volume of business and, in a number of instances, are unable to make good deliveries on some classes and sizes of tools. In the majority of cases plants are being operated on full time, although some of the larger establishments have not yet attained normal conditions. Special tool makers are probably more actively engaged than builders of equipment of the standard types; heavy tool makers also report a very satisfactory condition of business.

While there has been no noticeable improvement in the export demand, as far as tools of the standard types are concerned, makers of specialties report a better volume of business, particularly in power transmission equipment.

The second-hand machinery market does not appear as active as it was several weeks ago. At the same time there has been a fair demand for some classes of tools, and the trade looks forward to better conditions in the near future, particularly as deliveries are becoming less prompt in some classes of new equipment. The market for second-hand engines and boilers continues dull. For new equipment of this class, however, a slightly better movement is to be noted. The demand for second-hand electrical equipment is reported to be quite active.

While there has not been any increased demand from the machinery trade for either iron or steel castings, the increased volume of business which has developed will, it is believed, result in a better demand for castings. The steel casting plants are fully occupied and prompt shipments are hard to get. Gray iron castings, however, can still be had promptly, as but few of the plants in this district are fully engaged.

The Wilkes-Barre Slag Roofing Company, Wilkes-Barre, Pa., has purchased ground in that city and will erect a building for manufacturing purposes. The structure will be of frame and corrugated iron and will be 25 x 100 ft. on the ground plan. All classes of roofing will be manufactured, and the company will entertain suggestions as to the equipment of the plant.

Samuel P. Williams, 223 North Calvert street, Baltimore, Md., is in the market for a 100 hp. boiler.

The Pennsylvania Railroad Company has purchased property in the vicinity of Bayview Junction, near Baltimore, and is understood to have further negotiations under way for additional ground. These purchases are being made with a view of removing its roundhouse, car shops and machine shops from its Mt. Vernon yards in Baltimore. The new roundhouse to be built will be designed to accommodate 75 locomotives. An electric plant will also be installed. Plans in connection with the work have, however, not yet been completed.

Frank Toomey, Inc., has recently purchased the complete tool equipments of several plants, the tools in connection with which are about ready to move. Several extensive power plants, including boilers, have also been recently purchased by this concern. Business in second-hand machinery, they state, has only been fairly active recently, although a better demand is anticipated in the near future.

The Lehigh Coal & Navigation Company is considering the erection of a large power plant at Broad Mountain, Pa. Preliminary plans have been prepared for both water and steam power installations, although no definite decision regarding the work is expected before summer.

The American Pulley Company has recently purchased 5 acres of ground adjoining its plant in this city. The acquisition was made in view of future possible extensions to its plant. The addition now building, reference to which has been made in these columns, will be completed in the next few months and will be devoted largely to the manufacture of sash pulleys. Business with this company is steadily increasing. The foreign demand for all wrought steel pulleys shows a decided betterment, heavy shipments for exports having recently been made.

The Enterprise Mfg. Company of Pennsylvania has recently acquired additional property on North Third street, adjoining its plant. This has been purchased for future use and does not mean any extension to its plant at the present time.

The Electrical Exhibition, held in the First Regiment Armory during the present week, has been attracting considerable attention in the trade. In addition to electric vehicles, the general application of electricity for power purposes is being demonstrated in many ways.

Chicago Machinery Market.

CHICAGO, ILL., February 15, 1910.

The machinery dealers are doing a good business right along and the manufacturers are apparently all well supplied with orders. There are now two large lists pending from Western railroads besides business which goes to the factories from Eastern roads, and while these lists do not cut a large figure in the manufacturing capacity of the machine tool builders, the steady accumulation of new business from all sources is in striking contrast with the conditions which prevailed a year ago. The automobile trade continues to be the wonder of the average business man and is a striking illustration of the fact that we are living in a country of enormous resources. Not a few business men believed that the automobile manufacturers would overreach themselves this year and would find that the country could not absorb their product, yet all superficial reports from the West would indicate that the supply of automobiles will not be equal to the demand, and new projects are coming forward for large factories to be erected the coming year in preparation for 1911. The automobile is a child of the machine tool industry, as it did not become a commercial success until the automobile manufacturers learned the use of modern machine tools which enabled them to give their product quality, durability and finish. But it is probable that during the coming year the average machine tool builder will prefer railroad business even though it is necessary to make very close prices in order to get it. One gets an outside impression in traveling around through the West that the railroads are in need of an enormous amount of shop equipment, as their rolling stock has not been in as bad condition in 15 years as it is now, owing to the lack of shop capacity to keep up repair work.

The Kentucky Packing Company, Louisville, Ky., will make improvements at an estimated cost of $100,000, which will include the installation of a cold storage plant and machinery for the manufacture of ice. Work will be commenced on the new plant at once, with the expectation of having it in operation by April 1.

Gragg Bros., Brook, Ind., owners of the electric power plant of that city, have just completed the installation of a 30-hp. motor and transmission line, and contemplate the installation of further transmission lines and equipment.

The National Car & Mfg. Company, Chicago, has been incorporated with $125,000 capital stock for the purpose of manufacturing, repairing and dealing in railroad and mining equipment. The incorporators are John Conrath, Thomas B. Conroy, Geo. E. Moore.

The Elgin Light & Power Company, Elgin, Texas, incorporated with $15,000 capital stock, has secured a 25 year franchise for an electric light and power plant. Work on the plant, which will cost about $14,000, will be commenced at once, with the expectation of having it completed within six months. The plant will be equipped with the following machinery, none of which has been purchased as

yet: Two 66-in. x 16-ft. boilers, two 11 x 12 in. high speed engines direct connected to two 50-kw., 2300 volt revolving field alternators 60 cycle, either one or three phase, and flaming arc lamps for street lighting. For full particulars address Thomas L. Deisch, box 133, Elgin, Texas.

The Albert Lea Gas Light Company, Albert Lea, Minn., has been incorporated with $200,000 capital stock to manufacture and sell gasoline lighting plants. The company is at present negotiating for a suitable building for manufacturing purposes for which the equipment will be purchased within the next 30 days. S. K. Swenson, formerly secretary of the American Gas Machine Company, is general manager of the company.

The Ford Motor Company, Detroit, Mich., is erecting a factory building at Kansas City, Mo., at a cost of $250,000, which, when completed, will be used as an assembling and distributing plant for the Southwest trade.

Douglas & Co., Cedar Rapids, Iowa, starch manufacturers, have purchased 13½ acres of ground near Eighteenth and Manchester streets, Kansas City, Mo., upon which it will erect a branch factory at a cost of about $175,000. The main building will be four stories, 101 x 201 ft., and a secondary building will be 73 x 164 ft., two stories. Besides these two factory buildings a power house 70 x 90 ft., two stories, will also be erected. It is expected that work will be commenced on these buildings early this spring.

The Fowler Heating Company, Waterloo, Iowa, which for a couple of years has been operating a plant for heating its own building and several others in the block in which it is situated, has organized the Central Heating Company with an authorized capital of $15,000. The plant, which has a present capacity of 300 hp., will be increased by the installation of an additional 100 hp. boiler and new piping.

The Michigan Motor Company, Detroit, Mich., is considering the erection of a factory at Rochester, Mich., that will employ about 200 men. The plant will be capitalized at $100,000 and will be known as the Michigan Motor Company, Ltd.

The Cleveland, Cincinnati, Chicago & St. Louis Railway, William Garstang, superintendent of motive power, Indianapolis, Ind., is preparing plans for the following structures which will be erected at a cost of about $1,000,000 at Beach Grove and will be ready for bids about March 1: One reinforced concrete reservoir, capacity 350,000 gal.; oil house of steel construction, capacity 50,000 gal.; foundry supply shop, 30 x 60 ft., one story, brick and steel construction; pattern safe, 65 x 190 ft., one story, reinforced concrete construction; power house, 48 x 116 ft.; warehouse, 84 x 104 ft.; wheel shop, 75 x 125 ft., one story; foundry, 134 x 264 ft., one story; two freight repair shops, each one story, 162 x 504 ft. and 130 x 244 ft., respectively; miscellaneous shop, 62 x 400 ft., one story; planing mill, 84 x 344 ft., two stories; paint shop, 180 x 444 ft., one story; dry kiln, 50 x 100 ft., one story; coach shop, 214 x 484 ft., one story.

The St. Louis Independent Packing Company, St. Louis, Mo., is receiving bids for the construction and equipment of a power house.

New England Machinery Market.

BOSTON, MASS., February 15, 1910.

The volume of manufacturing in the metal lines continues unabated, taking it as a whole. Business is still spotty; sharp fluctuations in amounts of orders are felt, even from week to week. The average, however, seems to satisfy owners. A study of cost records for the last year, including the present month, proves that the variations are very general in most lines of manufacturing. Cost charts show that the pendulum of trade has swung between actual loss and handsome profits, the mean being a margin of gain fully up to the average. This condition is probably responsible for a large measure of the recent slight let-up. Similar periods have been passed through by industrial plants as individuals in many cases since the upward trend began, but attention was not called to them as it has been recently by the break in the stock market. The general expression of opinion is that nothing has occurred to disturb business seriously.

Boston lodge of the Machinists' Union has adopted a new minimum wage scale, to become operative June 1, as follows: For specialists, $3 a day; all around machinists, $3.50, and tool makers, diemakers and the machinists in State or city employ, or in printing, brewery or other special lines, $4. The enforcement of this scale would mean a considerable advance in wages for a large number of workmen.

The Fenn Needle & Mfg. Company has been incorporated under Connecticut laws, with authorized capital stock of $1,000,000, to manufacture latch, sewing machine and hook needles. A. G. Fenn, 93 Church street, Chicopee Falls, Mass., president and general manager, states that the location of the factory has not been determined, as the company is waiting to secure a site most favorable to its purposes, but that it will be in the market for a complete modern machine shop equipment, together with steam engine and boilers, electric generators and motors. James H. W. Harris, Hartford, Conn., is the vice-president, and Simeon J. Griffin, West Springfield, Mass., secretary and treasurer.

Announcement is made at Rutland, Vt., that the Rutland Railroad will erect a new boiler shop in that city, 85 x 140 ft., one story, of steel and hollow concrete blocks, and will spend $20,000 in new tools. A 25-ton traveling crane will be installed. In addition the company has been authorized to purchase $11,000 worth of tools for the machine shop and blacksmith shop.

The Colton Combination Tool Company, Chester, Vt., is bringing out two new types of patented tool holders, acquired from R. E. Colton. One is a double holder, designed to carry two tools, taking simultaneous chips, and also arranged to take two sizes of cutting off tools. The other is also of the double tool type, and is designed primarily for cutting piston rings and similar work, although it may be used for general purposes.

The Parker Transmission & Equipment Company, Springfield, Mass., has taken space in the building of the Waltham Watch Tool Company in that city and will manufacture transmission mechanisms for automobile and general purposes. The company is making inquiries regarding shop equipment.

H. G. Barr, Worcester, Mass., has brought out a heavier model of his No. 4 sensitive drill press, known as the No. 7, which differs only in proportions, far greater rigidity and strength being provided by the use of additional metal.

The Mattatuck Mfg. Company, Waterbury, Conn., manufacturer of sheet metal and wire goods, has increased its capital stock from $75,000 to $225,000, the issue being in the form of a stock dividend of 200 per cent.

The George D. Mayo Knitting Machine Company, Laconia, N. H., has acquired land upon which a foundry 70 x 150 ft. will be erected in the spring. The building will be rented to James McGloughlin, proprietor of the Belknap Iron Foundry, who will occupy it for manufacturing iron and brass castings.

The Fore River Shipbuilding Company, Quincy, Mass., has been awarded the contract for six Curtis steam turbines, which will be installed on two scout cruisers, to be constructed for the Italian navy. The engines will be designed to develop 28,000 hp. each.

The Industrial Exposition at Worcester, Mass., last week, duplicated the success of the initial show last year, though some of the exhibitors were missing, largely because of the activity of business. Mechanics and Washburn halls were filled with displays of machinery and tools and other manufactures, and large crowds were in attendance. Among the concerns which gave practical demonstrations of their products were the Whitcomb-Blaisdell Machine Tool Company, Worcester, engine lathe; O. K. Toolholder Company, Shelton, Conn., tool holders; W. H. Leland Company, Worcester, sensitive drill presses; the Norton Grinding Company, Worcester, cylindrical grinder; Coates Clipper Mfg. Company, Worcester, variety of equipment embodying the company's flexible shafting; Prentice Bros. Company, Worcester, lathes and drills; R. E. Kidder, woodworking machinery and presses; Chandler-Farquhar Company, Boston, Cochrane-Bly Company, Rochester, N. Y., cold saws and a new saw sharpener. Other exhibitors included the Coes Wrench Company, Worcester, wrenches; the Graton & Knight Mfg. Company, Worcester, leather belting; H. G. Barr, Worcester, sensitive and power drill presses, including a new tapping head; Henry G. Thompson & Son Company, New Haven, Conn., hack saws and hack saw machines; John T. Burr & Son, Brooklyn, N. Y., cold saw; Buck Bros., Millbury, Mass., chisels; Colton Combination Tool Company, Chester, Vt., tool holders; William J. Smith Company, New Haven, Conn., adjustable reamers; Hill Dryer Company, Worcester, clothes dryers and ash sifters; Sterling Hardware Company, New York, hardware specialties; Brown & Sharpe Mfg. Company, Providence, R. I., machinists' tools; Norton Company, Worcester, aluminum products; Stewart Boiler Works, Worcester, boilers; Union Water Meter Company, Worcester, meters, and the Oakley Steel Foundry Company, Millbury, Mass., crucible steel castings. Little doubt exists that the exposition has become an annual institution.

The contract has been awarded for the addition to the shops of the Hendee Mfg. Company, Springfield, Mass., manufacturer of a motor cycle, allusion to which has been made. The building will be 42 x 256 ft., five stories and basement.

The Bridgeport Malleable Iron Company, Bridgeport, Conn., manufacturer of malleable and gray iron castings, will install steam engines of 1000 hp. to replace gas engines. The boilers, engines and other apparatus have been arranged for.

The Grand Trunk Railroad has petitioned the Rhode Island Legislature for rights within that State, the use of which would mean the making of Providence an important port of entry for a system covering a vast growing territory, and at the same time would increase the city's importance as a shipping point of agricultural and other products. The line as planned would connect in Massachusetts with the Central Vermont link of the Grand Trunk System, and would

pass through Southbridge, Webster and other Massachusetts towns to Woonsocket, R. I., and thence through the important city of Pawtucket to Providence. Much significance is given the move in its effect upon future conditions in New England.

The Hill Dryer Company, Worcester, Mass., has been incorporated with capital stock of $50,000, with Joseph P. Hill as president and treasurer; George A. Sargent, clerk, and Burton P. Hill, vice-president. The company manufactures clothes dryers and ash sifters, and of late has been making a specialty of sheet metal work.

The Boston & Maine Railroad has appropriated an additional $1,775,000 for improvements, including $550,000 for a new line between Newmarket and Madbury and $900,000 for 100 new passenger cars.

The Underwood Typewriter Company, Hartford, Conn., denies the published statement that it proposes to double its works the coming season. No definite conclusions have been arrived at regarding extensions.

The Universal Machine Screw Company, Hartford, Conn., will issue $100,000 of 6 per cent. bonds, with the proceeds of which the new plant at the north end of the city will be built and equipped. The company has at present about $142,000 of outstanding capital stock, which will be increased to $150,000 by the sale of additional shares. A change in the board of officers has been effected. Charles Phelps remains the president and R. Hakewessel the general manager. Goodwin Smith has been elected treasurer, and T. W. Russell vice-president. The directors comprise these officers and C. E. Bond, all Hartford men. With the increased resources and new plant the company's business will be expanded in a large way, following a success already very pronounced.

Cleveland Machinery Market.

CLEVELAND, OHIO, February 15, 1910.

Machinery houses have received a fair volume of orders during the week and several report some improvement in the number of inquiries. No good sized lists have come out, but some of the inquiries are for five or six tools. The demand is mostly for general machine shop equipment; the majority of orders that are being received are for medium sized and small tools. Only a limited amount of business is coming from the automobile trade, but there is a fair number of scattering orders from makers of automobile parts and from small new concerns that are starting into that line. Very little business is coming from the railroads in this territory, railroad orders being limited to an occasional one for a single tool. The demand for steam hammers and other forging shop equipment is holding up well. Inquiries and orders for cranes continue fairly numerous, and some of the manufacturers are considerably behind on deliveries.

There is a good steady call for second-hand tools, and dealers are eager to pick up all they can at reasonable prices. A good assortment of slightly used tools, about 35 in all, which were placed on the market by the closing up of a local plant early this month, was nearly all sold out within about 10 days by a local machinery house.

While the sagging of prices in the stock market has aroused some pessimistic talk regarding the business situation, reports from manufacturers in metal working and other lines indicate that conditions continue satisfactory and that orders are not falling off. Concerns that have had under consideration the erection of new plants or additions are going ahead with their plans and contracts are being let for buildings to be started as soon as weather conditions permit. There is considerable business in sight from this source in the line of power equipment as well as machine tools and general machinery.

The Chandler & Price Company, Cleveland, maker of printing presses and paper cutters, will soon begin the erection of a large foundry and power plant, plans for which have been prepared by the Cleveland Engineering Company. The new building will be 50 x 200 ft., three stories and basement. The first story and basement will be used for storage, the second story for cleaning, coremaking and pattern room, and the third story for the foundry. The building will be of brick, steel and concrete. The power plant will occupy an L adjoining the new foundry building. The power plant equipment, for which bids will be received shortly, will include two 250-kw. cross compound generating units, one 125-kw. cross compound generating unit, and three 250-hp. water tube boiler units, one double unit and one single unit. Coal handling machinery, bunkers, &c., will be installed in connection with the power plant. The present power transmission equipment will be gradually replaced with the group plan motor drive, one motor to be provided for each room. About 40 motors will be required, ranging from 10 to 60 hp. The company will also soon be in the market for complete foundry equipment, consisting of sand conveying, mixing and tempering machinery and molding machines. Eight or ten molding machines will be required. Molding machines will be used exclusively in the plant, except for repair and jig work. One or two elevators will be installed in the foundry.

The Broughton Bolt Company, which established a plant at 3420 Hamilton avenue, Cleveland, about a year ago, has found that its present quarters are inadequate to its growing business and has decided to locate in another city in the vicinity of Cleveland. The company has been negotiating with the Board of Commerce of Lorain and with another northern Ohio city, and expects to decide within a few days where it will locate its plant. This company now makes small cold bolts. It will manufacture larger sizes when it moves to its new quarters, which will be fully twice as large as the present plant. As soon as a site is selected the company will be in the market for new machinery, including bolt cutters, headers, &c. The company, which was capitalized at $50,000, has just increased its capital stock to $75,000. The officers are John S. Broughton, president; J. C. Beardslee, vice-president; G. W. Greber, secretary and treasurer.

The American Fork & Hoe Company will begin early in the spring the erection of a storage warehouse for fork and hoe handles at its Jackson, Mich., plant. The building will be 87 x 140 ft. and three stories. It will be of reinforced steel and the only contract that has been let has been for the reinforcing steel. There will be two electric elevators, a complete sprinkling system, ventilating shutters, &c. Plans for the building have been prepared by Burchard & Case, engineers, Cleveland, who will place all contracts.

Plans for the new power plant to be erected in connection with the new Cuyahoga County Court House, Cleveland, now nearing completion, have been prepared by the Cleveland Engineering Company, and it is expected that bids for the plant's equipment will be advertised for shortly. The plans provide for boiler capacity of 14,000 hp. in four units, two 500-kw. cross compound generating units and one 100-kw. simple generator unit, all condensing; also condensing apparatus for all the units. As the plant will be located at considerable distance from the court house a tunnel will be built connecting the two buildings, and the contracts will include a large amount of steam piping.

The Firestone Tire & Rubber Company, Akron, Ohio, will begin the erection of a large new plant early in the spring, plans for which are being prepared by the Osborn Engineering Company, Cleveland. Floor space amounting to 500,000 sq. ft. will be provided. A new power house will be erected in connection with the plant, in which will be installed 3500 hp. boiler capacity and engines and generators of 2500 hp.

The Goby Engine Company, Cleveland, has been incorporated, with $100,000 authorized capital, to manufacture a new gas engine for automobiles. A stationary gasoline engine may also be manufactured. The company expects to establish a plant shortly. The incorporators are Christian Girl, L. W. Thomas, G. G. Cockburn, C. S. Goby and J. B. Hull.

The Maumee Rapids Electric Company, Toledo, Ohio, has been incorporated, with $350,000 capital stock, to carry out a hydro-electric project. The company has acquired an old power plant at Maumee and water rights at other points. New equipment will be installed at Maumee, and with the plants that the company expects to erect in the near future at other points a capacity of about 10,000 hp. will be provided. The incorporators of the company are George W. Stevens, Charles S. Ashley, Grant Miller, H. W. Haslup and Eliot Norton.

The Cleveland Axle Mfg. Company, Canton, Ohio, announces that it has purchased the plant and business of the Dalzell Axle Company, South Egremont, Mass. The plant will be dismantled and the machinery moved to the Canton plant.

The Wright Wrench Company, Canton, Ohio, will soon begin the erection of a new plant.

The Sure Hold Calk & Mfg. Company, recently incorporated in Mansfield, Ohio, with an authorized capital of $15,000, has established a plant on East Sixth street, in that city, for the manufacture of an adjustable toe calk for horseshoes.

The local purchasing department of the New York Central lines has an inquiry out for a 1500-lb. steam hammer.

H. J. Schlosser, Warren, Pa., is in the market for an 18-in. lathe, new or secondhand.

The attention of hardware manufacturers is called to the fact that the Cuyahoga County Building Commission, 425 Garfield Building, Cleveland, will receive bids March 7 for furnishing the hardware required for the new court house in Cleveland. This contract is expected to amount to about $40,000. Plans and specifications, including drawings for a special design, are on file at the office of the commission. Full details regarding these proposals will be found in an advertisement in this week's issue of *The Iron Age*.

The Ireland & Mathews Mfg. Company, Detroit, Mich., is in the market for three 18-in. lathes.

The Cook Motor Company, Delaware, Ohio, has an inquiry out for a 54-in. boring mill. A good second-hand one is preferred.

Cincinnati Machinery Market.

CINCINNATI, OHIO, February 15, 1910.

Order books of tool manufacturers, while still well filled for future delivery, have not been materially improved in the way of new business since the first of the month. No complaints are heard; in fact, toolmakers particularly have rather welcomed the little lull since it has enabled them to put their shop systems in better working order and carry out promises made late in the year for spring delivery. This is especially true of the lathe and milling machine manufacturers. With the lathe makers automobile concerns still furnish the major portion of business, and there has been considerable of this character from Michigan and northern Ohio.

Showing the widespread interest taken by tool and general machinery makers in the subject of apprenticeship and shop labor problems generally, correspondence on file at the office of the Cincinnati Metal Trades Association asks Secretary Manley for additional information on a subject matter given out as an expected topic of an address to be delivered at the annual meeting on March 3. These inquiries come from distant States, such as Wisconsin, New York, Alabama, &c. The subject in question was "The Apprenticeship Scheme of the New York Central Railroad." The item was printed in *The Iron Age* of February 3, and Secretary Manley and the committee were hopeful at that time that the speaker, a man of international importance, could be secured, but it has since been learned that he will not be available. There will, however, be a variety of interesting topics and speakers. One, a foreigner very much in the public eye, whose name may not now be divulged, is practically assured, and the following have already accepted: George R. Elliott, chemist and metallurgist of the Lunkenheimer Company, will give an illustrated lecture on "The Structure and Adaptability of the Iron Alloys;" Stanley Bowdle, a lawyer, who matriculated at the Cramp shipyards in Philadelphia as a machinist, will talk on "The Mechanical Advance in America," and J. H. Renshaw, instructor at the now famous Continuation Schools of Cincinnati, will tell of the work being done in that branch of the public educational service, supplemented by an exhibition of work of students.

Considerable interest is being taken in the enterprise of Frank R. Vanderstucken and an associate named Ewing, a fellow student of the Boston School of Technology, who have organized a $40,000 corporation and are building a steel fabricating mill at Bethlehem, Pa. Mr. Vanderstucken is a son of Frank Vanderstucken, the noted composer, and former conductor of the Cincinnati Symphony Orchestra. A number of Cincinnati capitalists, including Chas. P. Taft, Harry M. Levy, Julius Fleischmann and J. G. Schmidlapp, have taken stock and have faith in the energy and cleverness of the young men. It is stated that they are now busy buying machinery and necessary tools, and hope to be ready to start about May.

The R. K. Le Blond Machine Tool Company reports a satisfactory volume of business, with orders booked five months on popular sizes of lathes and milling machines. President R. K. Le Blond is still in the West Indies.

The Fosdick Machine Tool Company is running on full time with full force and enough business booked to keep busy for two or three months without additional orders. The new horizontal type boring machine is receiving much attention.

Little or no foreign business is reported from the large manufacturers of tools; an occasional order for two or three tools comes in, but as a rule export inquiry is very quiet. It is hoped to stimulate some European interest in the many new types and special developments along tool lines at the coming American Exposition which opens in Berlin in May. President Thomas P. Egan of the J. A. Fay & Egan Company has started a movement to have Cincinnati concerns exhibiting consolidate their machines into an Ohio exhibit.

The Buckeye Nut Company, Columbus, Ohio, has been placed in the hands of a receiver and J. L. Hampton named.

F. A. Patten has purchased a half interest in the Haynes machine shop, Van Buren, Ind., and the concern is now known as the Haynes Machine Company.

I. Newton Spriggs has been appointed receiver of the Columbus Bridge & Iron Company, Columbus, Ohio.

The Adamson Machine Company, Akron, Ohio, has been moved from Exchange to Carroll street and considerably enlarged. The new plant is of fireproof construction, steel frame, with roof of cement tile and floors of concrete. The machine shop and foundry, each 80 x 160 ft., are of brick, two stories, and equipped with 15-ton electric cranes. The new lathes and shapers added are of motor drive pattern.

The Buckeye Steel Castings Company, Columbus, Ohio, declared an extra dividend of 2 per cent. on the common stock early in the month, making 8 per cent. for the year. The regular quarterly dividend of 1½ per cent. on the preferred stock also was paid. The company reports business quite satisfactory, with the outlook good.

Milwaukee Machinery Market.

MILWAUKEE, WIS., February 15, 1910.

The machinery trade in this State has slackened somewhat during the past week, as compared with the close of last month and the opening days of February. This condition affects only the number of bookings actually made, and there is nothing in the appearance of work at the various shops to indicate any letup in the demand; quite the reverse.

One phase of the situation, however, that begins to attract the attention of close observers, is the impending probability of the lack, before very long, of capital sufficient to provide for the tremendous expansion of manufacturing facilities now going forward. Thus far funds in large volume have been available, but reserves are being rapidly depleted and there is at least a tendency towards stringency of the local money market, so far as building and equipment loans or increases of working capital are concerned. Then, too, the laying in of large stocks of material, which has been quite general through this section, ties up a large aggregate of funds. These conditions have not yet assumed any serious aspect, and the writer has no warrant for stating that they will; they are merely of interest as possible indications of the not far distant future, for which the trade generally will do well to be prepared.

Another factor to be taken into account is the present inadequacy of the motive power and other equipment of nearly all railroads, which materially delays deliveries and, in consequence, returns, and compels manufacturers of machinery to provide just so much more capital for carrying on their business. This condition grows worse from month to month.

As an indication of the general activity of production affecting all classes of labor, the extent of the demand for hand implements such as picks, shovels, crowbars, &c., which has been steadily increasing since early last fall, deserves consideration. Wisconsin dealers find trade particularly good in the iron ore, zinc and lead districts, while manufacturers report a very even run of sales in all parts of the country except the East and the purely agricultural sections of the South and West. All companies along the shores of Lake Michigan and Lake Superior that handle supplies for the West and Northwest across their own docks, such as the large coal wholesalers, are preparing for a heavy shipping season as soon as navigation opens; and there is much replacement and extension of machinery, especially power, hoisting, conveying and pneumatic apparatus, which was allowed to get run down during the two severe years of the depression. In nearly all new installations provision is made for electrical operation and control. This trade is a good deal scattered along a long coast line and it has been overlooked recently by not a few manufacturers and supply houses, but it is well worth cultivating.

The rebuilding and re-equipment of Northern ore docks, to which allusion has heretofore been made in *The Iron Age*, is also going steadily forward and many purchases on this account are still to be made, as some owners prefer not to have the obligations of any one month show up too large on the books. This is particularly true of apparatus that can be quickly installed and is really not needed until all construction work has been finished. Taking a broad survey of the local industrial field, as far as the metal trades are affected, one feature of great interest at the present time is the degree in which investigation and experimental work of every nature are being conducted by manufacturers, either for the purpose of increasing their lead over competitors or purely as a matter of self-preservation in order to maintain the positions that they now hold. Many marked improvements in machinery and methods of production brought about by this means have been referred to at length in *The Iron Age*, but new lines of development are constantly opening up.

For example, several Northwestern machinery builders, including two gas engine manufacturers in the vicinity of Milwaukee, are testing out oil gas producers, any really efficient type of which can be introduced to excellent advantage throughout the Southwest and on the Pacific Coast, where crude petroleum is cheaper than other fuel.

Another phase of development work recently taken up by a local concern is the conveying of concrete material, slag, ashes, &c., through tubes by compressed air or suction, thereby dispensing with the barrows, cars, elevators, &c., customarily used. Among the possibilities of this service are portable outfits with gasoline engine driven or motor driven compressors.

The erection of a new foundry by the Phoenix Mfg. Company, Eau Claire, Wis., as forecasted some weeks ago, is stated to have been definitely determined upon, and work will begin as soon as weather conditions are favorable.

By the installation of additional woodworking tools and power equipment, the capacity of the Northland Lumber Company, Green Bay, Wis., will be materially extended. Some new tools for repair work may also be needed.

The Fuller & Johnson Electrical Company, Madison, Wis., has secured the contract for placing an electric plant in the county buildings at Mt. Pleasant, Iowa.

The Bain Wagon Company, Kenosha, Wis., which recently changed its plant over to electric drive, will install some additional motors.

The Fairbanks-Morse Company, Beloit, Wis., has been awarded contract for power and pumping machinery with which to operate the new municipal water works and electric plant at San Benito, Texas.

The plant formerly occupied by the Owen-Thomas Motor Car Company, which now forms part of the Corliss Motor Company, and the equipment of which was removed from Janesville, Wis., to Corliss, Wis., may be occupied in the near future by a new automobile company. The commercial interests of Janesville are taking united action to that end and negotiations with outside capitalists were recently opened. If present plans are carried through it will mean large orders for tools.

The shops of the Wisconsin Engine Company, Corliss, Wis., are now operating continuously, day and night, owing to the number of orders in hand for mill engines and pumping engines, as well as the regular Corliss type, designed for general power service.

The new machine shop of the Pawling & Harnischfeger Company, Milwaukee, is nearing completion. It will give this concern much needed facilities for enlarged production of some of its later specialties, such as the combination tools for machine work which it is now putting out.

One of the largest power plants in Wisconsin will be built during the coming fall, at or near Plymouth, Wis., by the Milwaukee & Fox River Valley Railway Company, if present plans for the construction of a traction line from this city to Appleton, 135 miles, are successfully put through, as there is every indication now that they will be. Equipment details are likely to be decided upon early, and the purchase of a heavy line of machinery will be involved.

A consignment of Wisconsin built motor cars for service in the Philippine Islands and China has been shipped to the Orient, via Manila, by the Mitchell-Lewis Motor Company, Racine, Wis.

The Wisconsin Engine Company has been awarded contract for a Corliss engine to be installed in the new power plant of the A. H. Weinbrenner Company, Milwaukee. The Crocker-Wheeler Company, Ampere, N. J., will supply generators.

The Cream City Foundry Company, recently organized here, is letting contracts for equipment, including a steam generating plant to be furnished by the Milwaukee Boiler Company.

Boilers, engines and special machinery will be installed in an addition to the plant of Potts, Wood & Co., Appleton, Wis., for the account of an Eastern firm which is understood to have arranged to manufacture its product there.

Machinery will soon be set up in the additions to Allis-Chalmers Company's West Allis works, including two new shops.

The largest crushing plant in this State will be operated this year by the John O'Laughlin Stone Company, Racine, Wis., which has provided for the addition of a No. 12 Gates gyratory crusher, elevators, screens and electric motors for driving the machinery.

The Badger State Machine Company, Janesville, Wis., which makes a specialty, among other things, of car shop tools, is stated locally to be in receipt of a large number of inquiries from steam and electric roads, with a reasonable percentage of actual orders, indicating considerable activity from these sources in the near future.

Claude & Starck, Madison, Wis., have been intrusted with the drawing of plans for a large central power and heating plant to be erected in connection with county buildings at Elkhorn, Wis. Boilers will constitute the heaviest part of the equipment.

Power and pressure machinery will be among the requirements of the Fond du Lac Pressed Brick Company, Fond du Lac, Wis., which has had plans prepared for enlarging its plant to double the present capacity. No definite statement of specifications covering the new equipment needed has been given out, but information may be obtained in due course by direct inquiry.

Plans for the enlargement of the Milwaukee Works of the International Harvester Company are said to have reached the stage where the layout of the mechanical equipment will soon be settled upon in detail. Local officials are not prepared, however, to give out the facts.

Among the exhibits at the Milwaukee Automobile Show will be a portable air compressor of the Christensen type, with alternating current motor, direct connected, such as the outfits manufactured in larger size for foundry and machine shop service. The manufacturer is reported to be the Allis-Chalmers Company. A similar unit, intended for garage service, may also be shown by the National Brake & Electric Company of this city.

At the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railway Company it is stated that a number of motors will be needed shortly to replace some that were destroyed in a fire, as well as for extension of shop facilities. The purchasing is, however, done in Chicago, where definite information must be obtained.

Boilers, engine, dynamo, pump, &c., will be required some time next month for equipping the power plant of a new industrial training school at Reedsburg, Wis. Inquiries should be addressed to James A. Stone, secretary of the Building Committee, or to Alvin E. Small, Madison, Wis., who is in charge of the construction.

The Northern Construction Company, Fond du Lac, Wis., which is a large buyer of apparatus and supplies of various kinds, both for itself and its clients, has been reorganized, M. McCugo having sold his interest to his partners. E. H. Lyons will be president and T. E. Dockery secretary. Mr. McCugo will continue to act as superintendent.

The Badger Brass Mfg. Company, Kenosha, Wis., will install one or more heavy motors either at that place or in its Eastern plant.

Additional machinery to be provided by the Sheboygan Couch Company, Sheboygan, Wis., will greatly increase the capacity of the factory, an extension to which is being built to accommodate the new tools. This company will, during the year, have need of considerable equipment, as its business is rapidly increasing.

Woodworking machinery and other equipment, including shafting, belting and probably electric motors, will be required before fall for a new factory to be erected by the S W. Miller Piano Company, Sheboygan, Wis.

The municipal authorities at Grand Rapids, Wis., are preparing for extensive water works construction, and bids are likely to be taken early in the coming summer on motor driven centrifugal pumps operating on current from the local hydroelectric plant.

The Wambold Mfg. Company, Milwaukee, has been incorporated to operate the brass foundry business heretofore conducted as a partnership under the name of the Wambold-Brunschweiler Company. An increase in shop facilities during the year will undoubtedly be necessitated by the present active condition of the company's trade.

One of the largest buyers of power equipment in this section, and particularly of motors, is the Simmons Mfg. Company, Kenosha, Wis., which has been steadily engaged for nearly a year past in extending its productive capacity. Another building to form part of the works will be completed this spring.

Apparatus for the new power house to be erected at its Racine, Wis., plant is being provided by the American Seating Company of Chicago. An order for four large boilers has just been given to the S. Freeman & Sons Company of that place. Electric drive is to be installed throughout the shops and motors purchased for that purpose.

The new 5000-kw. hydro-electric plant of the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., recently forecasted in *The Iron Age*, is now an assured fact, the contract for the dam and generating station at Cedar Falls having been recently let. Detailed specifications covering the machinery will be taken up next, although actual purchases may be delayed until the outside work is well along.

The erection of a number of new shop units, work on which is expected to begin by May 1, has been decided upon by Thomas B. Jeffrey & Co., Kenosha, Wis. This concern can hardly avoid being in the market for new tools, motors, &c., at relatively frequent intervals, as the heavy demand for its machines constantly forces production beyond the limits of normal shop capacity.

The purchase of equipment for its large new docks at Superior, Wis., which are to be electrically operated, has been taken up by the Pittsburgh Coal Company, and it is stated locally that all necessary contracts will be closed shortly at the company's headquarters.

Plans for a large electric generating station to be located between Milwaukee and Madison are under consideration by the Milwaukee Electric Railway & Light Company, but no authoritative statement of the details is obtainable at the present time, as President John I. Beggs consistently maintains the policy of not making such facts public until he is ready to act upon them. The need of more power for operating the interurban lines of the system has been partially provided for by taking current over a long distance transmission line from the hydro-electric development at Kilbourn, Wis., but with the completion of projected extensions additional generating units will be imperatively required.

The Racine Mfg. Company, Racine, Wis., which recently suffered a heavy loss by a fire in which a large portion of its plant was destroyed has decided to rebuild, and as soon as possible the wreckage of the old buildings will be cleaned up. Four-story buildings erected on the old foundations of brick and steel construction and equipped with sprinkling system. It is expected that the first of the buildings will be completed by May 1. The company has increased its

capital stock to $400,000. The company had a large factory building nearly completed at the time of the fire, which it has since equipped and put in operation, thus enabling it to make deliveries of its product which consists of automobile bodies.

Miscellaneous Machinery and Power Equipment.

It is reported from Albuquerque, N. M., that the Albuquerque Electric Power Company will install tubular boilers of about 800 hp. and a steam turbine or Corliss engine generating unit of 500 kw., to provide additional current that is urgently required by the increased needs of the service.

Additional machinery will be needed for an extension of the plant of the Bering Mfg. Company, Houston, Texas, which was recently determined upon. Electric drive may be used.

A cross compound engine of 5000 hp., with direct connected generator, to furnish continuous current at 600 volts, will be installed in the power plant of the San Francisco, Oakland & San Jose Consolidated Railway Company, Oakland, Cal. A contract for the main equipment has already been let, but some auxiliary apparatus remains to be purchased.

A hydraulic turbine of 300 hp. direct coupled to a 200-kw. generator will be added to the plant of the Blind River Light, Heat & Power Company, Blind River, Ont.

Two tubular boilers with automatic stokers, Corliss engine, dynamo, switchboard and other apparatus will be bought about May 1 for the city pumping station at Lansing, Mich.

It is reported from Birmingham, Ala., that the Russellville Iron Ore & Metal Company, Russellville, Ala., will be in the market for considerable new equipment during the course of the year to provide for a larger output.

The Wm. M. Volker Mfg. Company, Houston, Texas, is proceeding with plans for the erection of an addition, 90 x 90 ft., and the installation of machinery to double the company's output.

W. H. Kellogg, Jr., Grand Rapids, Mich., is working on plans for a large hydroelectric plant on the Benzie River, east of Frankfort, Mich.

The plant of the Las Vegas Light & Power Company, Las Vegas, N. M., is to be enlarged, and one or more additional generating units will probably be provided in the near future.

A new pumping unit is likely to be required about June 1 for the municipal water works at Coalgate, Okla., the capacity of which is to be increased.

New machinery has been provided for the plant of the Rauch & Lang Carriage Company, Cleveland, Ohio, and more may be needed by fall.

The Mershon-Bacon Company, Bay City, Mich., whose increase of facilities for manufacturing was recently mentioned, will install some additional motors for machine operation.

A generator of 100 kw., two-phase, 60 cycles, 2300 volts, with exciter and switchboard, coupled to a high speed compound engine of 160 hp., will be purchased the latter part of this week by the city of Aurora, Ill.

A vertical cross compound vertical engine, with cylinders 28 and 60 in. x 48 in. stroke, direct connected to an electric generator, is to be added to the power plant of the San Diego Electric Railway Company, San Diego, Cal.

The Oskaloosa Traction & Light Company, Oskaloosa, Iowa, has been investigating the relative economy of gas producer, Corliss engine and steam turbine plants, with a view to increasing its electric generating equipment. An additional unit of 250 to 300 hp. will probably be installed before fall.

The capacity of the water works system at Delaware, Ohio, will be enlarged.

Boilers, engine, electric generator, motors for machinery drive and other equipment will be purchased by the Sommers Bros. Match Company, Saginaw, Mich.

A rotary kiln 125 ft. long and 8 ft. in diameter will be installed by the Kirkfield Portland Cement Company, Raven Lake, Ont.

Plans are in progress for a municipal electric plant at St. John, Kan., although none of the details has as yet been worked out.

Nine water tube boilers of 350 hp. each are to be purchased for new pumping stations by the city of Chicago, Ill., tenders to be received some time within the next month or two. Some electrical machinery will also be required about the same time.

The Miller-Crozier Lumber Company, recently organized at Charleston, W. Va., is reported to have decided upon the erection of a large cutting plant near Anthony, W. Va., for which power and operating machinery will need to be supplied.

An electric power plant will be built in the fall of this year, somewhere along its line by the Evansville, Mt. Carmel & Olney Traction Company, Mt. Carmel and Grayville, Ill. The prime movers used will probably be steam turbines.

The King Paper Company, Kalamazoo, Mich., whose new plant was mentioned in *The Iron Age* last week, has already closed contracts for electric generating units of 1800 hp. combined capacity of 95 direct current motors.

A new pumping plant for filling the tanks of locomotives and for general shop and roundhouse service will be built by the Chicago & Northwestern Railway at Belle Plaine, Iowa, in connection with extensive improvements there.

For the new water works station at Burlington, Iowa, recently referred to, there will be required three 300-hp. water tube boilers, designed for high pressures, furnaces with dumping grates; three engine driven centrifugal pumps with a combined capacity of about 15,000,000 gal. daily, feed pumps, heater, crane, coal conveying system and auxiliary apparatus. Purchase of machinery will be made the latter part of this week.

A resawing plant and planing mill may be erected at Tacoma, Wash., during the coming summer by the Winkleman Lumber Company of that place, necessitating the purchase of a large quantity of machinery.

An engine driven electric generating unit of 800 hp. and 30 to 35 motors for alternating current, with other machinery, are required by the Quaker Oats Company for its plant at Akron, Ohio.

It is reported from Scranton, Pa., that boilers aggregating 1500 hp. in capacity will be purchased by the Delaware, Lackawanna & Western Railroad for its power station there. An additional turbine unit may also be installed, contract for one having been made some time ago and later canceled, owing to the general cessation of business.

A gas engine power plant of 100 hp., air compressors, &c., will be purchased for Federal construction work in the vicinity of Wheeling, W. Va., where the United States engineer's office may be addressed for information.

The electric plant of the Idaho Power & Transportation Company at Idaho Falls, Idaho, has been sold to the H. M. Byllesby Company, Chicago. It is stated locally that improvement of the property, with installation of machinery for a greater output, will be effected.

The Modern Carriage Company, Seattle, Wash., will add to its motor equipment.

A gas or oil engine may be purchased this year by C. E. Logan, proprietor of the electric power plant at Sheldon, Iowa, to take care of the peak load and furnish current for commercial day service.

Machinery will be provided by the Muskogee Ornamental Glass Works, Muskogee, Iowa, for a new manufacturing plant. This company was recently organized by F. A. Cole and Paul E. Balfay of that place.

W. F. Fargo, Jackson, Mich., has been engaged to prepare plans for a steam power plant which will be operated by a company known as the Commonwealth Power Company. Details can doubtless be obtained by application to him.

The Keokuk & Hamilton Water Power Company, whose plans for a large hydroelectric power development at Keokuk, Iowa, have been mentioned in *The Iron Age*, will proceed shortly with the erection of its own cement plant at Hamilton, Ill., to supply the binding material for concrete used in the dam. A large stone crushing plant and quarry equipment, including compressors, will also be required.

Electric generating machinery will be purchased in the near future by the Oliver Electric Power Company, Oliver, Ga., for a new central service station.

The construction of a municipal power and lighting plant is under consideration by the authorities at Newport News, Va., steam turbine units being favored.

A power plant and water works station with electrically operated pumps will be erected at Pasadena, Cal., by the Park Tract Land & Water Company.

One of the largest electric generating stations in the Southwest, equipped either with turbines or gas engines, will be built at Handley, Texas, by the Northern Traction Company, Fort Worth, Texas, the present equipment being retained as a reserve. Details have not been confirmed, but can be obtained in due course by addressing the company directly.

Engine driven generating units having an aggregate capacity of 1500 hp. will be added to the power equipment of the Sandwich, Windsor & Amhurstsburg Railway, Windsor, Ont. The contract is, however, understood to have been already let to Canadian builders.

A boiler house is to be erected on the site of the Pioneer Furnace at Negaunee, Mich., by the Consolidated Fuel & Lumber Company to serve a new flooring mill which is also to be built there. Operating machinery for the woodworking plant has been ordered, but the steam generating equipment remains to be contracted for.

An electric power plant of 750 kw., driven by Corliss engines or a steam turbine, will be required for a new manufacturing establishment which the H. A. Robinson Company, Akron, Ohio, is planning to erect. The F. P. Construction Company, Cleveland, Ohio, has been placed in charge of construction. Operating machinery for a clay products works will also be required.

Geo. Rowen, Alvin, Texas, is reported to have decided upon the erection of a new electric generating plant, for which machinery will be needed in the near future.

A belt driven electric generator of 250 kw., with auxiliary machinery, is to be added to the power plant of the Light, Heat & Power Corporation, Leominster, Mass.

A Corliss engine of 750 hp. and other apparatus will be required for the municipal electric plant at Lincoln, Neb. Tenders will be received until the last week in this month or a few days later by R. C. Ozman, city clerk.

At Lumberton, N. C., the Kingsdale Lumber Company, Kingsdale, N. C., is planning to build a plant of large capacity, for which boilers, engines, cutting machinery and possibly electrical equipment will be needed.

The C. H. Sharp Contracting Company, Kansas City, Mo., will erect a No. 8 breaker and revolving screen plant for crushed stone, but whether for its own account or that of a client is not stated. The gyratory type of crusher has been decided upon. For operating the plant some existing power equipment may be utilized.

New boilers will probably be purchased by or before spring for the municipal water works at Saginaw, Mich.

Four hydraulic turbines and generators having a combined output, on normal load, of 3500 hp., several smaller units and a large line of auxiliary apparatus, including transformers, will be installed by the James White Power Company, Athens, Ga., in a new power development. Contracts for the bulk of the equipment are understood locally to have been already let.

A manufacturing plant may be built this spring at Aberdeen, S. D., by the Ball Multo-Spark Plug Company. Negotiations to that end are now in progress.

A Corliss engine of 300 hp. and possibly electric generating machinery will be required by Irving D. Andrews & Son, Littleton, N. H., for a new factory at Portland, Maine. For supplying steam to the plant tubular boilers will be installed.

A large steel kiln for cement burning, together with accessory machinery, will be provided by the United States Portland Cement Company, Concrete, Colo., for the works there.

A new factory is to be completed in the spring at Chicago, Ill., for the Fowler Lamp & Mfg. Company, which supplies the automobile trade. Motors will be used for driving the machinery and current may be purchased from the Commonwealth Edison Company.

The Pyle Iron Preserving Company is being organized at Muskogee, Okla., by David W. Pyle of Guthrie, and others, for the purpose of promoting a new process of preserving the interior of piping.

The Oakland City Electric Light & Power Company, Oakland City, Ind., is proceeding with plans for installing additional boilers, Corliss engine, dynamos, &c., with which to largely increase the capacity of its plant.

Additional power equipment is to be provided for enlarging the capacity of the Warsaw Water & Light Company's electric plant at Warsaw, Ind. A steam turbine generating unit similar to that last installed by the Winona Iuterurban Railway may be purchased.

An engine driven generating unit of 100 kw. to furnish alternating current is to be provided for the municipal plant at Louisville, Ga.

Installation of a belted generator of 100 hp. has been decided upon by the Stover Milling Company, Stover, Mo., together with subsidiary apparatus.

The plant of the Pittsfield Electric Railway Company, Pittsfield, Mass., is to be operated, condensing equipment for that purpose having recently been ordered from the Warren Steam Pump Company, Warren, Mass.

An air compressor is to be installed in the near future by the Empire State Mining Company, Bisbee, Ariz.

A power house, 40 x 100 ft., and woodworking shop, 26 x 52 ft., will be built by the Chicago, Milwaukee & Puget Sound Railway Company in connection with its repair plant near Tacoma, Wash. Equipment now in service at Bismarck, N. D., will be removed to the new location and some additional tools, motors, shafting, &c., provided.

A pumping plant is to be built this year at Hamburg, Ark., and the matter of machinery with which to equip it will be taken up in the near future.

A steam power unit or electric plant will be needed during the coming summer to operate the pumping station at Maywood, Ill., three pumps for which are also to be purchased. More definite details can be obtained a little later on.

Plans are in progress for the building of the hydroelectric power plant to be operated by Bedford City, Va., and the dam site has been acquired. Turbines and generators to provide 1000 hp. will constitute the intital equipment, and purchase of machinery is to be considered in the near future.

A steam turbine of 1000 hp. and 750-kw. generator will be bought this spring by the Great Falls & Old Dominion Railway, Washington, D. C., together with auxiliary apparatus.

An engine driven dynamo of moderate capacity will be needed for the power plant of the Crockett Ice, Electric Light & Power Company, Crockett, Texas.

Plans for the proposed water works at Yacoit, Wash., have been prepared by Arthur D. Monteith of Portland, Ore., who was recently engaged for the purpose, and the matter of equipment will probably be considered shortly.

The S. N. Brown Company, Dayton, Ohio, will provide additional motors for its plant.

The Oswego Light, Power & Supply Company, Oswego, Kan., has decided upon the installation of two belted generators of 50 kw. and 75 kw., with exciters, switchboard panels and auxiliary apparatus.

Machinery will be purchased this spring for a pumping plant of considerable size at Corpus Christi, Texas, where $90,000 has been provided for the construction of water works.

Additional gas and electric generating machinery will be required for the central station of the Rochester Light, Heat & Power Company, Rochester, Minn. Enlargement of the plant has been decided upon, but no detailed plans have as yet been prepared.

Some power equipment will be needed for a new two story factory which the Triumph Pickle & Catsup Company will build at Collinsville, Ill., and possibly a limited quantity of other machinery, although most of it will be supplied from a plant now operated at East St. Louis, Ill.

The Arizona Gold Mines Company, Kingman, Ariz., will install new apparatus for its concentrating plant.

Construction of a municipal power and light station is under consideration at Temple, Ariz.

A steam turbine of 1000 hp., with alternating current generator direct coupled, exciter, transformers, switchboard and motors will be provided by the St. Louis Plate Glass Company for a power plant operated in connection with its works at Valley Rock, Mo.

Machinery will be required shortly for the new woodworking plant to be erected by the W. L. Russell Box & Lumber Company, McKees Rocks, Pa.

A plant for the manufacture of gas engines may be established in Denver, Colo., during the coming summer by the Multonomah Machine Mfg. Company, Ft. Worth, Texas. If so, both new tools and existing equipment will be utilized, all to be motor driven.

Improvements and additions to the shops at Washington, Ind., are said to be contemplated by the Baltimore & Ohio Southwestern Railroad, to cost $175,000.

The Hercules Buggy Company, Evansville, Ind., has been incorporated with $1,000,000 capital stock, as vehicle manufacturer. The incorporators are W. H. McCurdy, H. E. McCurdy, F. M. Hills, J. D. Craft and A. H. Loeb.

The R. Johnson Yarn & Cordage Mills have been incorporated at Madison, Ind., with $50,000 capital stock, to manufacture cotton yarn, cordage and cotton goods. The directors are R. Johnson, Wm. J. Johnson and D. Johnson.

The M. J. Hoffman Construction Company has been incorporated at Evansville, Ind., with $15,000 capital stock, to do a general construction business. The directors are M. J. Hoffman, Albert J. Hoffman and William Greisbacher.

A special committee of the City Council of Columbus, Ind., has recommended the purchase of new machinery to increase the capacity of the gas plant, also additional and larger mains.

The Airless Tire Company, Indianapolis, Ind., has increased its capital stock from $225,000 to $250,000. C. O. Henderson is president.

The Standard Oil Company will establish a distributing branch at Cambridge City, Ind., which will make necessary the building of tanks.

It is reported from Detroit, Mich., that the Van Dyke Automobile Company has given the Board of Commerce assurance that it will build a large motor car plant there, work to start about the middle of spring or the beginning of summer.

The purchase of a Murray-Corliss high duty pumping engine, built by the Murray Iron Works, Davenport, Iowa, has been practically decided upon by the municipal authorities at Galesburg, Ill., whose plans were mentioned in *The Iron Age* some time ago. This decision is said to have been reached after a visit to a similar plant at Burlington, where one of these units is rendering exceptionally economical service.

A horizontal cross compound pumping engine of 4,000,000 gal. capacity will be provided for the addition to the water works at Gadsden, Ala., recently referred to, and considerable other equipment, including apparatus for a filtration plant, is to be required.

A direct current generator of 50 hp., with some other apparatus, will be installed by the Vermont Marble Company, Middlebury, Vt.

A new plant, to be equipped with power and cutting machinery, including a heavy band mill, is being erected by the Michigan-Arkansas Lubrication Company, Nettleton, Ark.

Two new tubular boilers and a generating unit of 1200 kw. will be installed in the power station of the Boston & Northern Street Railway Company at Lawrence, Mass., where reconstruction of the original plant layout has been begun.

Three motor generator sets of 500-kw. each will be required by the Grand Valley Railway Company, Brantford, Ont., early in the coming summer.

Some additional machinery will be installed this year by the Loud & Hoeft Company, Rogers City, Mich., including new sawing outfits.

A jaw or gyratory crusher, gasoline engine, generator, &c., will be among the season's requirements of the Harvey Machine Works, Kansas City, Mo.

A motor driven centrifugal pump, to be held as a reserve at the new filtration plant, will be bought before long by the city of Rock Island, Ill.

A municipal power and lighting plant, with modern generating machinery, will be provided at Newport, Cal., where funds for the purpose have been voted.

Construction of a municipal pumping plant and water supply system is under consideration at Swainsboro, Ga.

The capacity of the Oklahoma City & Suburban Railway's power house in Oklahoma City, Okla., will be increased by the addition of boilers and a steam turbine generating unit, with auxiliary machinery. Motor generator sets to convert alternating current into direct are also to be provided.

A new battery of boilers is being installed in the Richardson Company's plant at Alpena, Mich., some additional equipment for which will be required later on.

A pumping unit of moderate capacity will probably be needed this year at Rogersville, Tenn., for municipal use.

A large crushing plant is to be constructed at Corinth, W. Va., by the White Rock Sand Company, in order to increase its output. The necessary machinery will be bought within a few weeks. Gyratory breakers are favored. Power equipment will also be needed.

Bids are to be taken February 21 for the construction of the headworks of the new hydroelectric generating station to be built by the city of Tacoma on the Misqually River in Washington, but turbines, generators, governors, &c., will not be purchased for some time. A unit of 500 hp. will, however, be required for temporary installation in the near future, to provide power for construction work.

Two steam turbines and generators with a total normal output of 2000 hp., together with auxiliary machinery and a large line of motors for operating the various units of the works, will be installed by the Clinchfield Portland Cement Company, Nazareth, Pa. A part of this equipment has already been provided for.

It is reported from Colorado Springs, Colo., that the Brown Lumber Company, recently organized there, will erect a large plant for which power equipment will be required.

Woodworking machinery, motors, &c., are to be purchased this spring for a new factory which the Baldwin Piano Company is planning to erect in Cincinnati.

The Dixie Motor Car Company is proceeding with work on a new motor car plant at Frederick, Okla., which will be equipped with a full line of electrically operated tools. A part of the apparatus needed, including power machinery, is understood locally to have been already purchased.

The Arnold Company, Chicago, is in charge of plans for a large electrically driven pumping plant and irrigation system to be built near Canon City, Colo., contracts for the construction of which will be let shortly. Purchase of equipment may not be considered, however, until some time later on.

A horizontal cross compound crank and flywheel pumping engine of 4,000,000 gal. daily capacity, or motor operated centrifugal pump, will probably be added to the water works at Waterloo, Iowa, where methods of increasing the capacity of the plant are now awaiting decision.

Belted generators having a combined capacity of 500 hp., with several large direct current motors, will be installed in the near future by the Watervliet Paper Company, Watervliet, Mich.

Water works sufficient for the present requirements of the city will be built for municipal service at Gainesville, Ga., or for operation under a franchise. Modern high duty pumping machinery will be required.

A large cutting plant, probably motor driven, will be erected by Nickey Bros., Memphis, Tenn.

The Jonz Auto Company, Beatrice, Neb., recently referred to, will increase the capacity of its electric power machinery.

A high pressure fire service system similar to that now in successful operation on Manhattan Island, where motor operated centrifugal pumps are installed, has been recommended for Boston, Mass.

The American Excelsior Company, Kansas City, Mo., a concern recently organized, has purchased a tract of land in that city on which it will erect a plant early in the spring.

The Dundee Hydraulic Power Company, Dundee, Mich., has been authorized by the State Railroad Commission, Lansing, Mich., to issue $10,000 worth of bonds for the construction of a water power station at Dundee.

The Wichita Railroad & Light Company, Wichita, Kan., is contemplating the construction of a power house at a cost of $300,000, and a new barn to cost $30,000.

The Cliff Electrical Distributing Company, Niagara Falls, N. Y., has been authorized by the Public Service Commission to increase its capital stock from $25,000 to $500,000, and to acquire and exercise the rights, privileges and franchises owned and controlled by the Niagara Falls Hydraulic Power & Mfg. Company, the increase being granted to provide means of payment to the selling company. This order segregates the affairs of the Niagara Falls Hydraulic Power & Mfg. Company so that such matters as relate to public service will be taken care of under the Cliff Company organization. The Cliff Company will issue 30-year, 5 per cent. gold bonds to the amount of $1,500,000.

The Chase & Baker Company, Buffalo, N. Y., Jacob Heyl, president, manufacturer of piano players and actions, has increased its capital stock from $300,000 to $750,000, for the purpose of making large extensions to its plant at Dewey avenue and the New York Central Belt Line, which will include the erection and equipment of a large seven-story factory and for the further purpose of providing funds for a piano manufacturing plant at Holly, Mich., recently purchased from the Hobart M. Cable Company of Chicago at a reported cost of over $200,000.

Proposals will be received by the Department of Public Works, Buffalo, Francis G. Ward, commissioner, Room 1, City and County Hall, for eight 750-hp. water tube boilers for the new pumping station, Bureau of Water, foot of Porter avenue, for coal and ash handling machinery for these boilers and for feed pumps, feed water heater and purifying system for the pumping station; for five 30,000,000 gal. vertical triple expansion engines for Buffalo Water Works at the new pumping station; also for one 30-ton electric traveling crane for the new pumping station.

The Last-Long Underwear Company, Oswego, N. Y., is preparing plans for the installation of electric motor driven machinery in its new plant.

Bids will be opened February 21 by the city clerk, Sabetha, Kan., for water works system. A 70,000-gal. steel tank is included in the list of requirements. Burns & McDonell, Kansas City, Mo., are the engineers in charge.

Among the requirements for the water works system at Merkel, Texas, are two 20-hp. and one 6-hp. gasoline engines, three triplex pumps, a 50,000-gal. steel tank, &c. John D. Gaither, city secretary, will open bids February 21.

Government Purchases.

WASHINGTON, D. C., February 15, 1910.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids for the following machinery March 1:

Schedule 2240, two pumps and motors; schedule 2242, one 18-in. screw cutting lathe.

The Isthmian Canal Commission, circular 561, calls for bids on hoisting engine, pumps, boring machine, gear cutters, milling tools, &c., bids to be opened March 7.

The Isthmian Canal Commission opened bids February 4 for the following machine equipment called for on circular 556:

Class 3.—Six vertical fire tube boilers—Bidder 1, Ames Iron Works, Baltimore, Md., $1019; 13, Dover Boiler Works, Dover, N. J., $808.44; 15, Fox Brothers Company, New York, $1062; 19, A. D. Granger Company, New York, $1170 and $1230; 20, E. Keeler Company, Williamsport, Pa., $1186; 23, Lebedjeff & Co., New York, $1132.50 28, Manning, Maxwell & Moore, New York, $1157.16; 30, Motley, Green & Co., New York, $1389; 35, Phœnix Iron Works Company, Meadville, Pa., $1140 and $1260; 37, Robb-Mumford Boiler Company, South Framingham, Mass., $1420; 40, Vermilye & Power, New York, $1139.70.

Class 9.—One hand power pipe cutting machine—Bidder 5, Barry & Aikens, Philadelphia, Pa., $1242; 11, Crane Company, Baltimore, Md., $1070; 15, Fox Brothers Company, New York, $998.60; 22, Knox & Brother, New York, $1125.24; 23, Lebedjeff & Co., New York, $1017.60; 28, Manning, Maxwell & Moore, New York, $1091; 29, Merrill Mfg. Company, Toledo, Ohio, $850; 30, Motley, Green & Co., New York, $1052.47; 40, Vermilye & Power, New York, $995; 43, Drew Machinery Company, Manchester, N. H., $1180 and $1055.80.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened the following bids for machinery and supplies February 8:

Class 61.—Three pipe threading and cutting machines—Bidder 33, Cameron & Byington, New York, $231.50; 36, Crane Company, Chicago, Ill., $740 and $840; 60, Fairbanks Company, New York, $218; 61, Frevert Machinery Company, New York, $242; 73, R. W. Geldart, New York, $369.

Class 82.—One engine lathe—Bidder 60, Fairbanks Company, New York, $1024; 161, Springfield Machine Tool Company, Springfield, Ohio, $1100; 182, Vandyck-Churchill Company, New York, $1250.

The American Sheet & Tin Plate Company, Pittsburgh, contributed $10,000 to a building fund of $300,000 raised by the Young Men's Christian Association of Pittsburgh last week.

The Union Drawn Steel Company, Beaver Falls, Pa., has increased its capital from $200,000 to $1,500,000. It recently absorbed the Standard Gauge Steel Company, also of Beaver Falls.

Iron and Industrial Stocks.

NEW YORK, February 16, 1910.

The stock market continues more or less depressed and probably will remain in this condition until the status of large corporations is settled by judicial decisions or by Congressional legislation. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	11⅞- 12	Railway Spr., com.	37¾- 41
Allis-Chalm., pref..	39⅛- 41	Republic, com.....	36 - 39
Beth. Steel, com...	27¼- 28¼	Republic, pref.....	99½-101⅛
Can, com.....	10⅞- 11⅝	Sloss, com.....	75½- 78¼
Can, pref.....	74⅜- 77	Sloss, pref.....116½-118	
Car & Fdry, com..	59 - 61¼	Pipe, com.....	24⅞- 25½
Car & Fdry, pref..117¾-119		Pipe, pref.....	77¾- 79
Steel Foundries...	56½- 58½	U. S. Steel, com..	77⅛- 80⅜
Colorado Fuel.....	35¾- 38	U. S. Steel, pref..118⅝-120	
General Electric...150¼-153½		Westinghouse Elec.	67 - 68½
Gr. N. ore cert....	68⅝- 71	Am. Ship, com.....	74
Int. Harv., com...	85 - 86	Am. Ship, pref....111 -112	
Int. Harv., pref.....120¼		Chi. Pneu. Tool...	41⅜- 47
Int. Pump, com...	44 - 49	Cambria Steel.....	47 - 48½
Int. Pump, pref...	84⅞- 86	Lake Sup. Corp...	23⅝- 24⅜
Locomotive, com...	47½- 50⅛	Warwick	11¼
Locomotive, pref...112 -113		Crucible St., com..	14¼- 14⅝
Nat. En. & St.,com.	21¾- 23½	Crucible St., pref..	84¾- 85¾
Pressed St., com...	38⅝- 41	Harb.-W. Ref., com.....	35
Pressed St., pref..102 -103		Harb.-W. Ref., pref.....	94

Last transactions up to 1 p.m. to-day are reported at the following prices: United States Steel common 79⅛, preferred 119¼, bonds 104⅞; Car & Foundry common 61⅛, preferred 119; Locomotive common 49⅜, preferred, 113; Colorado Fuel 37¼; Pressed Steel common 41½, preferred 102; Railway Spring common 41; Republic common 39, preferred 101; Sloss-Sheffield common 75¾, ex div.; Cast Iron Pipe common, 24⅝; Can common 11¼, preferred 76¼.

Dividends.—The Harrison-Walker Refractories Company has declared a dividend of ½ of 1 per cent. on the common stock, payable March 1. This is the first dividend since October 1, 1907, when an initial quarterly dividend of ½ of 1 per cent. was paid.

The Wheeling Steel & Iron Company has declared a quarterly dividend of 2 per cent. and an extra dividend of 2 per cent., payable March 1, making 10 per cent. declared in the past year. The statement submitted to the stockholders at the annual meeting held in Wheeling last week showed 22 per cent. earned last year, with a surplus of over $2,000,000.

The Niles-Bement-Pond Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable February 15, and 1½ per cent. on the common stock, payable March 21.

The J. A. Fay & Egan Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable February 21.

Railroad Building in Cuba.—The *Railway Age Gazette* reports great activity in railroad building in the Provinces of Pinar del Rio, Santa Clara, Camaguey and Oriente, Cuba, and many thousand men are employed. Most of the work under way is to close up gaps in existing lines and to strike out across new territory, so that even the most remote corners of the island may have convenient connection by rail with the largest cities or the smallest towns. In the last named province the completion of the work under way will open up the entire southwestern portion of it, and it is expected that the line between Bayamo and Santiago will be opened in June of this year. In his last message to Congress President Gomez recommended the building of a line between Nuevitas and Caibarien on the north coast of the island, and a bill was subsequently introduced in Congress to subsidize the construction of this line. In Santa Clara Province the new work consists of an extension running south from Placetas to Trinidad, which is about half finished and is located between and runs parallel to the Sancti Spiritus and the Cienfuegos branches.

The Great Northern Railway Company is making arrangements for building a new ore dock at Allouez, Wis., during the coming season. The new dock will have a piling and concrete foundation, with the dock structure proper of steel, and is to be known as No. 4. It will have 300 pockets for handling ore and will be 1800 ft. long, extending out into the bay. The material used make it absolutely fireproof. It is the intention to have this dock completed and ready for shipping ore when the season of 1911 opens.

CONTENTS.

Trade Publications.

Belt Conveyers.—Stephens-Adamson Mfg. Company, Aurora, Ill. Volume 8, No. 1, of monthly pamphlet entitled *Conveying and Transmission.* Devoted largely to illustrations and tables of dimensions of various belt conveyer appliances. There are illustrations of actual installations and a number of suggested schemes are also shown. The remainder of the pamphlet is used to show the different appliances such as troughing and flat belt carriers, guide rollers and trippers. Three views of special interest are those of the conveyers and carriers installed at the Porto Bello crushing plant of the Isthmian Canal Commission.

Pumping and Dredging Machinery.—Byron Jackson Iron Works, Inc., 351 Market street, San Francisco, Cal. Five bulletins and one catalogue. No. 26 is concerned with the Jackson seven-step vertical turbine electric sinking pump for mine use, operating at either 1440 or 1700 rev. per min.; No. 29 covers the Jackson horizontal and vertical centrifugal pumps with illustrations of parts and tables of dimensions; No. 30 refers to a line of sand, gravel, slime and cyanide centrifugal pumps; No. 31 lists multiple stage turbine and series centrifugal pumps for belt or motor drive; and No. 32 is devoted to a line of special pumps, both portable and stationary, for use with various types of prime movers. Catalogue No. 28 gives general description and specifications of the Jackson patent deep well turbine pump.

Die Holders.—Wells Bros. Company, Greenfield, Mass. Catalogue. Illustrates the Little Giant line of die holders, for use on screw machines, which includes the clutch and solid holders for the ordinary and spring types of screw threading dies. Tables of sizes and dimensions of the different holders are given, and the two kinds of dies are also shown with tables of data.

Vertical Boring Mills.—Gisholt Machine Company, Madison, Wis. Bulletin. Describes the friction headstock and the lever control of the Gisholt vertical boring mills. The special feature of this device is that the driving mechanism of the table is entirely self-contained in a separate casing, which enables the whole drive to be removed in a short space of time if necessary.

Pumping Machinery.—Geo. E. Dow Pumping Engine Company, First and Howard streets, San Francisco, Cal. General catalogue No. 14, size 6 x 9 in., 146 pages. Shows a great variety of steam, electric and power pumps and hydraulic machinery. The illustrations, in addition to showing the different styles of pumps, include the U. S. armored cruiser California, which is completely equipped with Dow pumps, and two of the sets of pumps employed on the pipe lines of the Southern Pacific Company between Bakersfield and Port Costa and Coalinga and Monterey, which are 113 and 288 miles long respectively. Tables of general interest are appended, and for convenience in ordering repairs, sectional views of each style of pump with all the parts numbered are included.

Automatic Traps.—The McAuley Automatic Trap Company, Third street and Penn avenue, Pittsburgh, Pa. Catalogue. Calls attention to an automatic high pressure trap for gas, steam and compressed air. The special features claimed for this device are an automatic discharge of all water of condensation with no escape of steam, no concealed working parts, and entire absence of diaphragms, springs and stuffing boxes, and ability to discharge water at any temperature. On account of the small loss of pressure in discharging the contents, it is stated that this machine is adapted for use in mines and bridge and structural shops.

Preservative Coating for Iron and Steel.—The Goheen Mfg. Company, Canton, Ohio. Catalogue. Size, 7¾ x 9¾ in. Illustrates and describes the use of carbonizing coating for preserving iron and steel work of all kinds. There is quite an extensive field for these coatings in the mfuing and smelting industries, where there are large surfaces of metal continually exposed to the destructive action of the gases and fumes generated in the smelting process, and the majority of the illustrations are views of smelting plants. The other engravings include railroad bridges and the elevated structure of the Philadelphia Rapid Transit Company.

Compound Engines.—American Engine Company, Bound Brook, N. J. Booklet. A reprint from the *Electrical World* of an article describing the arrangement of engine cylinders to produce uniform torque used by this company in its angle compound engines contains typical indicator cards from these engines and a derived crank effort diagram. The method of obtaining the latter is described and the contrast between this and one for a tandem compound engine delivering the same amount of energy is shown. Tests made on these engines showed a torque which was almost as uniform as that produced by a steam turbine with a considerably lower steam consumption. These engines are suitable for almost any class of service, but are especially adapted for isolated lighting plant work in hotels, apartment houses and office buildings.

Blast Furnaces.—The William B. Pollock Company, Youngstown, Ohio. Supplement No. 17 to the general book of views of modern blast furnaces built by this company recently. Shows the work completed the latter part of last year for the Struthers Furnace Company at Struthers, Ohio, which consisted of the razing of the old furnace and the erection of a new one.

Asbestos Packing.—H. W. Johns-Manville Company, 813 Superior avenue, N. W., Cleveland, Ohio. Volume 1, No. 1 of a new monthly publication entitled the *J-M Packing Expert*, devoted to the asbestos packings of this company. As might be expected, asbestos receives considerable attention. There is the first installment of "The Story of Asbestos," and illustrations of asbestos mines, crude asbestos and asbestos-metallic jointless gaskets for boiler manholes and handholes. A brief history of the Cleveland office is also included.

Cash and Parcel Carriers.—Lamson Consolidated Store Service Company, 161 Devonshire street, Boston, Mass. Bulletin No. A-1. Concerned with a line of push-car carriers for cash and packages for stores where the tension of a spring furnishes the propelling power. These carriers are designed for use on level lines not exceeding 100 ft. in length or where the length of the line is less than 60 ft. with a slight grade. Four different styles of cash carrier and three models of wire basket parcel carrier with leather cash boxes attached thereto are shown.

Pyrometers.—Sarco Fuel Saving & Engineering Company, 90 West street, New York. Bulletin No. 3 P, size 8 x 10½ in.; 12 pages. Refers to the Sarco recording and indicating pyrometers manufactured under the Thwing patents. Space is devoted to a general article on the field of the pyrometer with a number of instances where savings have been effected through their use. The various types of instruments are illustrated and described and a reprint from the October issue of *Foundry* is included.

Calendar.—Hazard Mfg. Company, Wilkes-Barre, Pa., makers of insulated copper wire and iron and steel wire rope, has issued its annual calendar for 1910. Each month is given a separate leaf measuring 16⅝ x 21½ in., and in the upper portion some particular product is illustrated in the large reproduction of the company's trademark, and in the spaces preceding and following the dates on the calendar for the month in the lower section there appear the names of other different specialties manufactured.

Steel Plate Fans.—Green Fuel Economizer Company, Matteawan, N. Y. Catalogue No. 127, size 6 x 9 in.; pages, 56. Lists the types and sizes of fans carried in stock and in addition contains an account of certain improvements made in fan construction and discussions of their cost and efficiency. Tables of air pressures with the velocity due to pressure when escaping to atmosphere, the volume of air escaping through an orifice having an area of 1 sq. in. at different pressures, and the power required to move the given volume of air are included, with tables of capacity, power and dimensions of the various sizes of fans. Different types of fans are illustrated and the various ways of discharging the air are shown.

Structural Steel.—John Eichleay, Jr. Company, Pittsburgh, Pa. Two booklets. Size, 3½ x 6½ in. The first contains a number of tables of weights and dimensions of I-beams, channels, tees, angles with equal and unequal legs, and zee bars; and safe loads for steel beams, I-beam columns and gas pipe posts. The other illustrates numerous structural contracts that the company has supplied the steel for and some where repairs have been made to existing bridges without suspending traffic for any considerable period.

Quarrying and Mining Tools.—Sullivan Machinery Company, Railway Exchange Building, Chicago, Ill. Three bulletins. No. 56-B is devoted to the Sullivan automatic slide valve hoisting engine, which is said to combine high steam economy with moderate cost. No. 60-C illustrates and describes plug and foot hole drills and stone dressing tools, and contains a number of views of the tools in actual use. No. 60-F pertains to a line of hammer drills for construction, quarrying and mining work and gives considerable information regarding the construction and use of these drills.

Exhaust Fans.—American Blower Company, Detroit, Mich. Two bulletins. The first, No. 271, gives general description and specifications of type V of the ABC cast iron exhaust fans. The various parts are illustrated and the four different types of discharge shown. No. 272 is devoted to the Dixie exhaust fan and contains a number of tables of general interest regarding the speed, capacity, horsepower and dimensions of these fans. A special feature of this fan is that feet are provided on all four sides so that it can be made to discharge in any direction by simply turning it over so that the opening is in the proper position and direction, and bolting it down.

Condensers.—Wheeler Condenser & Engineering Company, Carteret, N. J. Pamphlet entitled "A Radical Improvement in Jet Condensers." Describes a jet condenser giving a vacuum of 28¾ in. of mercury designed so that a thorough mixture of the exhaust steam and cooling water is secured and at the same time the formation of air pockets is prevented. To carry out these requirements and deliver the air present to the air pump at a minimum temperature necessitated a number of interesting departures from the generally accepted standards of condenser design, which are brought out in the pamphlet. Two illustrations show the condenser installed in an electric railroad power house, together with other apparatus of this company and a section of the condenser, respectively. The results of a series of tests of the condenser are included.

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:	
1 to 1¾ in. round and square	₩ lb 2.00¢
1½ to 4 in. x ⅛ to 1 in.	₩ lb 2.00¢
1½ to 4 in. x ¼ to 5-16	₩ lb 2.20¢
Rods—¾ and 11-16 round and square	₩ lb 2.20¢
Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.25¢
3 in. x 3-16 in. and ⅛ in.	2.50¢
1½ to 2½ in. x ⅛ in.	2.25¢
1½ to 2¾ in. x 3-16 in. and thicker	2.25¢
1 to 1¼ in. x 3-16 in.	2.35¢
1 to 1¼ x ⅛ in.	2.45¢
⅞ x ⅛ in.	2.55¢
¾ x ⅛ in.	2.65¢
⅝ x ⅛ in.	3.70¢
½ x 3-32 in.	4.50¢
Tees:	
1 in.	2.50¢
1¼ in.	2.60¢
1½ to 2½ x ¼ in.	2.30¢
1½ to 2½ x 3-16 in.	2.50¢
3 in. and larger	2.30¢
Beams	2.25¢
Channels, 3 in. and larger	2.25¢
Bands—1½ to 6 x 3-16 to No. 8	2.45¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.50¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	2.00¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 14 to 16	₩ lb, 3.20¢
Nos. 22 to 24	₩ lb, 3.55¢
No. 26	₩ lb, 3.75¢
No. 28	₩ lb, 4.10¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—Galvanized.

Nos. 22 and 24	₩ lb .5.75¢
No. 26	₩ lb .6.25¢
No. 28	₩ lb .7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd.
No. 24	₩ 100 sq. ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A. Charcoal:	
IC, 14 x 20	$5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20 107 lb	$4.40
IX, 14 x 20	5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 50
IX, 20 x 28 with an 8 lb. coating	10 50

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):	
⅝ x 6 and smaller	70&7½%
Larger and longer	65&5%
Common Carriage (rolled thread):	
⅝ x 6, smaller and shorter	70&12½%
Phila. Eagle, $3.00 list	80&5@80&10%
Bolt ends with C. & T. Nuts	65&5%
Machine (Cut Thread):	
⅝ x 4 and smaller	70&12½%
Larger and longer	65&10%

Nuts

Blank or Tapped.

Cold Punched:	Off list.
Square	4.90¢
Hexagon	5.50¢
Square, C., T. & R	5.30¢
Hexagon, C., T. & R	6.10¢
Hot Pressed:	Off list.
Square	5.40¢
Hexagon	5.80¢

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 20½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 15¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 15¼¢ ₩ lb

Brass Wire—

List August 1, 1908. 15¼¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 15¼¢

METALS—

Tin—

Straits Pig ₩ lb 36@36½¢

Copper—

Lake Ingot	₩ lb 14¾@15 ¢
Electrolytic	₩ lb 14¾@15 ¢
Casting	₩ lb 14¼@14½¢

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

Spelter—

Western ₩ lb 6¾@7 ¢

Zinc.

No 9, base, casks ₩ lb 8¼¢ | Open ₩ lb 8¾¢

Lead.

American Pig	₩ lb 5½@5¾¢
Bar	₩ lb 6¾@6¼¢

Solder.

½ & ½, guaranteed	₩ lb 21½@22 ¢
No. 1	₩ lb 18½@19 ¢
Refined	₩ lb 16¾@17 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb ..@10¢
Hallett's	@10¢
Other Brands	@9½¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting 34¢

Rods & Wire Base Price 31¢

Sheets Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 11.75@12.00
Copper, Heavy and Wire	₩ lb 11.25@11.50
Copper, Light and Bottoms	₩ lb 10.25@10.50
Brass, Heavy	₩ lb 8.00@ 8.25
Brass, Light	₩ lb 6.50@ 6.75
Heavy Machine Composition	₩ lb 10.50@10.75
Clean Brass Turnings	₩ lb 7.50@ 7.75
Composition Turnings	₩ lb 8.75@ 9.00
Lead, Heavy	₩ lb ...@ 3.75
Lead, Tea	₩ lb ...@ 3.50
Zinc Scrap	₩ lb ..@ 4.50

THE IRON AGE

The oldest paper in the world devoted to the interests of the Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry

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